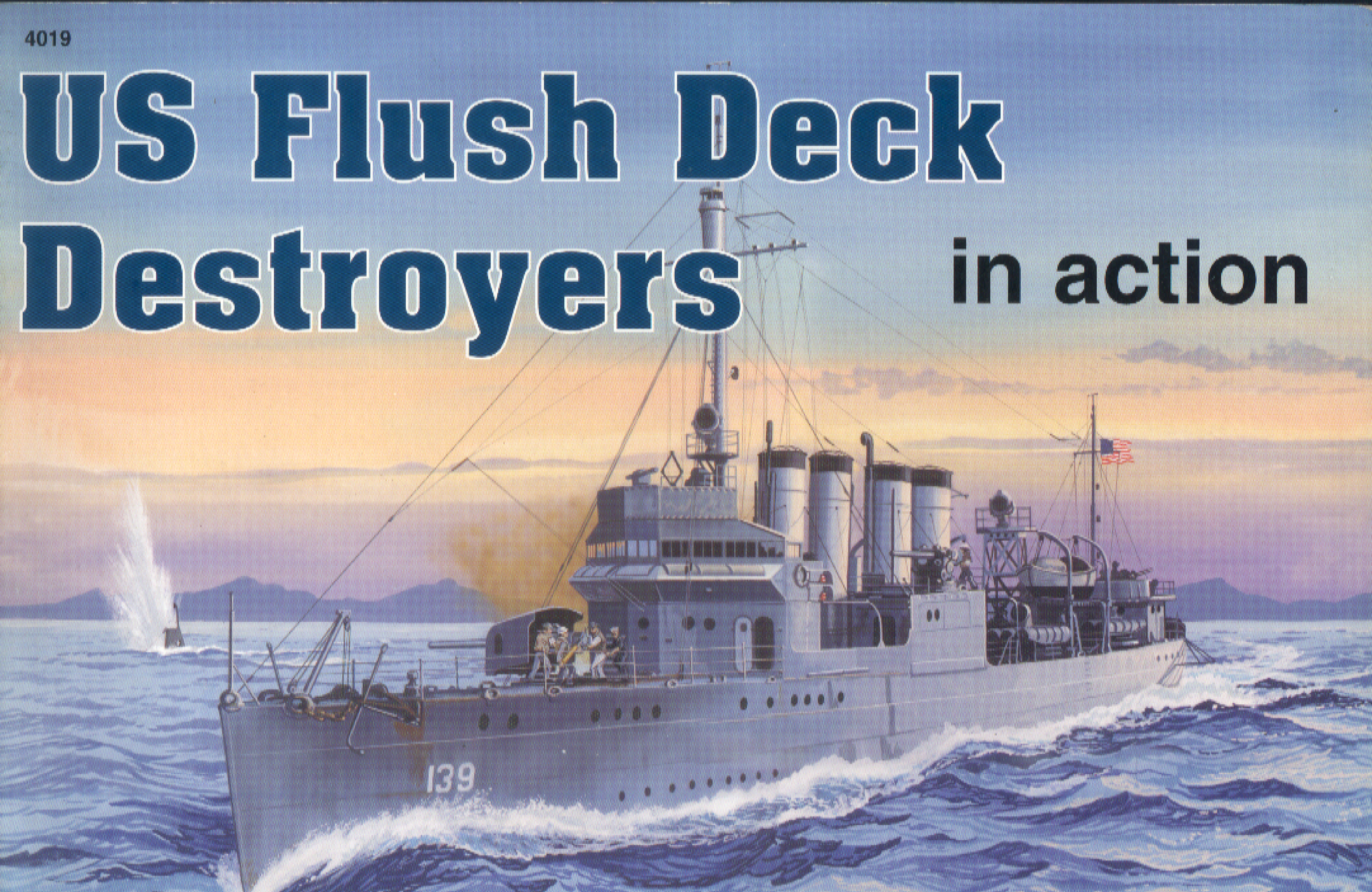
4019

US Flush Deck Destroyers in action



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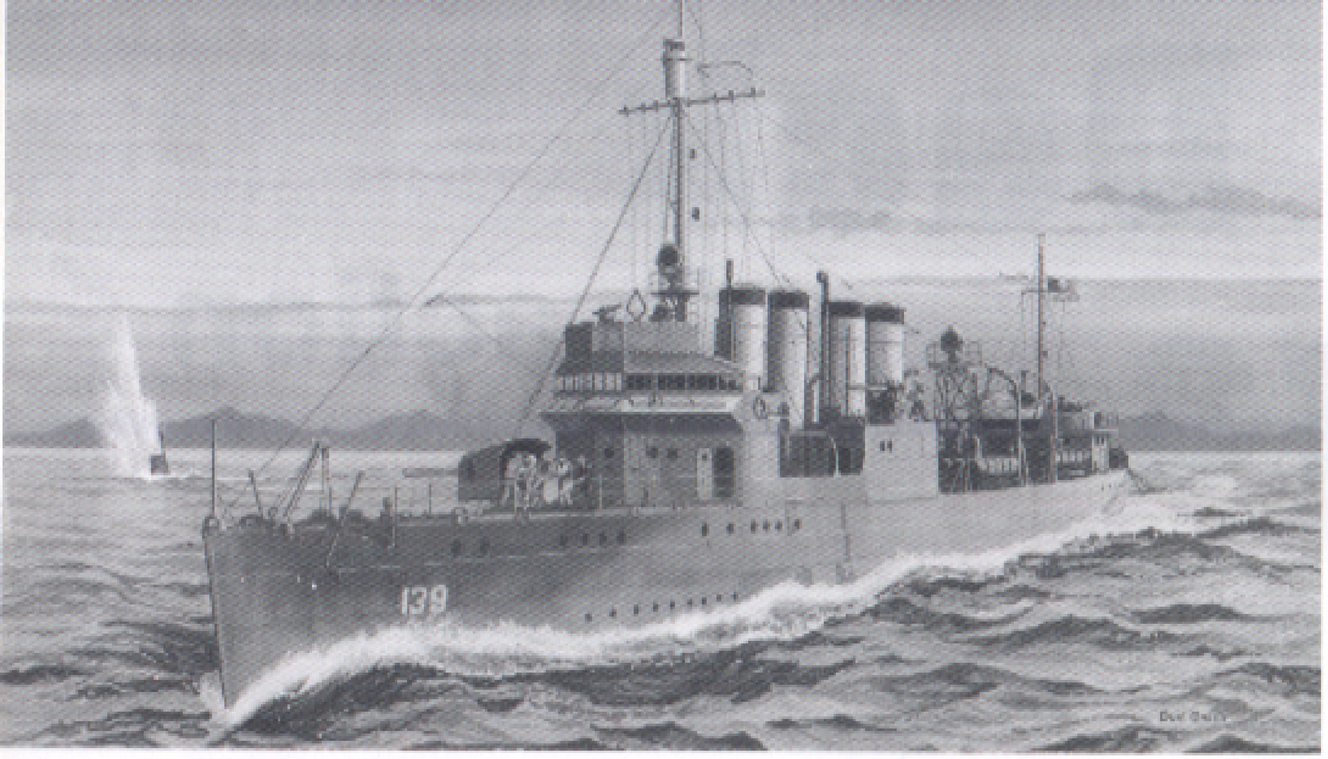

USS WARD (DD-139) sinks a Japanese Type A midget submarine off the channel entrance to Pearl Harbor, Hawaii at 0653 hours on 7 December 1941. This was just over one hour before Japanese aircraft attacked the US Pacific Fleet at Pearl Harbor. WARD is painted in Measure 11, the Sea Blue System.

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The CLEMSON Class destroyer USS OVERTON (DD-239) moves through heavy Atlantic waters while escorting a convoy on 23 June 1943. She closes up with the escort carrier USS SANTEE (CVE-29), from which this photograph was taken, for refueling and replenishment of fresh supplies. The 'flush deck' four stack destroyers – most ready for the scrappers – were called to duty in World War Two. Some of these vessels had served in the First World War when the second great conflict began. (Real War Photos)

Introduction

The US Navy's 'flush deck' destroyers – built during and just after World War One – were outdated and ready for the scrapper's torch by the beginning of World War Two. Nonetheless, they were pressed into service and all performed up to expectations. These vessels served the US Navy, the British Royal Navy, the Royal Canadian Navy, the Royal New Zealand Navy, the Soviet Navy, and one even served with the Imperial Japanese Navy.

Destroyers were first conceived as a larger version of the late 19th Century torpedo boat. The torpedo boat was designed to carry and launch the new self-propelled underwater torpedo that had been developed in England and adopted by the United States. The original torpedo boats were small, with most displacing under 150 tons (136 MT), and they were armed with a pair of torpedo tubes. They were coal fired and their speed of 25 knots (29 MPH/46 KMH) was considerably faster than most ships of the time. The introduction of torpedo boats with their torpedoes marked the first time that a small ship was capable of sinking a much larger vessel.

The original destroyers were designed as ocean escorts and therefore had to have the range and speed to keep up with the fleet. Ocean escort duties included both scouting and barrier defense roles. Fuel was the major obstacle, since coal was the chosen fuel and it was both heavy and it took up quite an amount of space. It was not until the introduction of the **PAULDING** (DD-22) Class of 1910 that oil became the destroyers' primary fuel.

The first US Navy destroyer was **USS BAINBRIDGE** (DD-1, ex-CTB-8), which was launched from the Neafie and Levy Shipyard in Philadelphia, Pennsylvania on 27 August 1901. She was 249 feet 9.875 inches (76.1 M) long, displaced 420 tons (381 MT), and was armed with two 18-inch (457MM) torpedo tubes and a pair of 3-inch (76MM) guns. Two Thornycroft boilers and Vertical Triple Expansion (VTE)[1] engines turned BAINBRIDGE's twin screws. Her speed of over 25 knots (29 MPH/46 KMH) was fast enough to keep up with any ship in the US Fleet. She carried 230 tons (209 MT) of coal for a range of approximately 3000 miles (4828 KM) at cruising speed. BAINBRIDGE and her four sisters (DD-1 through DD-5) except CHAUNCEY (DD-3) were stationed at Cavite, the Philippines. CHAUNCEY (DD-3) was sunk in a collision with the steamship SS ROSE on 19 November 1917, but the other four ships remained in service until withdrawn from use in 1920.

USS BAINBRIDGE (DD-1) was the first destroyer authorized for the US Navy in 1899. She was armed with two 3-inch (76MM)/25 caliber guns, five 6-pounder (57MM) guns, and two 18-inch (457MM) torpedo tubes. Power came from four coal fired Thornycroft boilers and their associated turbines, which provided a speed of 28 knots. This vessel displaced 420 tons and had a high forecastle deck. Four of the five BAINBRIDGE Class ships served in the Philippines during their careers. (Elsilrac)

The BAINBRIDGE Class was redesigned into a quartet of improved 400-ton (363 MT) destroyer classes. These were the **HOPKINS** (DD-6, two ships), **LAWRENCE** (DD-8, two ships), **PAUL JONES** (DD-10, three ships), and **STEWART** (DD-13, four ships) Classes. They all served until they were scrapped in 1920. These early destroyers were nicknamed 'flivvers,' referring to the Ford Motor Company's Model T automobile. The Model T was called a 'tin can on wheels;' thus, the name 'tin can' was used to describe an early destroyer. The destroyer sailors became known as 'tin can sailors,' a name that all destroyer men carry with great pride.

The five-ship **SMITH** (DD-17) Class of 1909 was the US Navy's first truly sea-worthy destroyer. These 293 foot 10 1/2 inch (89.6 M) long ships introduced a high forecastle for improved performance in rough seas and displacement was raised from 400 tons to 700 tons (635 MT). Four Mosher boilers provided steam to the 10,000 horsepower (HP) Parsons three-shaft turbines on each vessel. Speed was rated at 28 knots (32 MPH/52 KMH) and their range amounted to some 2800 miles (4506 KM) at ten knots (12 MPH/19 KMH). Armament was five 3-inch guns and three 18-inch single torpedo tubes. The SMITH Class served until 1919, following the First World War, when they were sold for scrap.

The PAULDING (DD-22) Class of 1910 were the first US destroyers to use oil for fuel. Oil

[1] A vertical triple expansion steam engine employs three separate pistons of increasing size. Each charge of steam from the boiler pushes these pistons against atmospheric pressure in the pistons' cylinders. Using three consecutive expansion processes kept the steam hot and extracted more useful energy.

STEWART (DD-13) was an improved BAINBRIDGE with higher speed, but with the same armament. The forward 3-inch gun was mounted above the bridge area and the aft 3-inch gun was mounted on a superstructure between the number four funnel and the aft 18-inch torpedo tube. STEWART was sold for scrap in 1920 and broken up. All of these small destroyers were called 'flivvers,' after the Model T Ford automobile of the time. (Elsilrac)

had the advantage of providing a hotter fire for the boilers and increasing range with less volume. Also the need to sail between coaling stations was eliminated, thus increasing their time on station. The ten PAULDINGs also introduced the new twin 18-inch torpedo launcher, with each vessel carrying three launchers. Their armament also included five 3-inch guns. The PAULDING Class served until they were broken up in 1934 to comply with the London Naval Treaty of 1930. The **MONAGHAN** (DD-32) Class of 1911 were repeats of the earlier PAULDING Class, with eleven ships being completed by 1912.

The eight-ship **CASSIN** (DD-43) Class were the first 1000 ton (907 MT) destroyers with length increasing to 300 feet (91 M). Most of these vessels were armed with four 3-inch guns except CASSIN and CUMMINGS (DD-44), which carried only three of the 3-inch weapons. CASSIN Class ships were also fitted with four of the twin 18-inch torpedo tubes. The six **O'BRIEN** (DD-51) Class destroyers were improved CASSINs with the addition of the new 21-inch (533MM) triple torpedo tubes. Like the earlier PAULDINGs, they were broken up in the mid-1930s to comply with the London Naval Treaty.

The **TUCKER** (DD-57) Class of six ships were the first US destroyers to introduce anti-aircraft armament and the ability to lay mines. Two 1-pounder (37MM) guns were installed to counter the new aircraft threat and 36 mines could be carried and dropped off the stern. WADSWORTH (DD-60) was fitted with the first US geared turbine in a destroyer. JACOB JONES (DD-61) became the only US destroyer to be lost to enemy action during the First World War when she was sunk off Start Point, Scillies by the German submarine U-53[2] on 6 December 1917.

Following the end of the First World War on 11 November 1918, the US Navy placed most of the early destroyers into a reserve fleet to await their fate. All of the coal fired ships were disposed of by 1921, since the US Navy had basically closed its coaling stations. The oil fired ships lasted until they were scrapped in the mid-1930s.

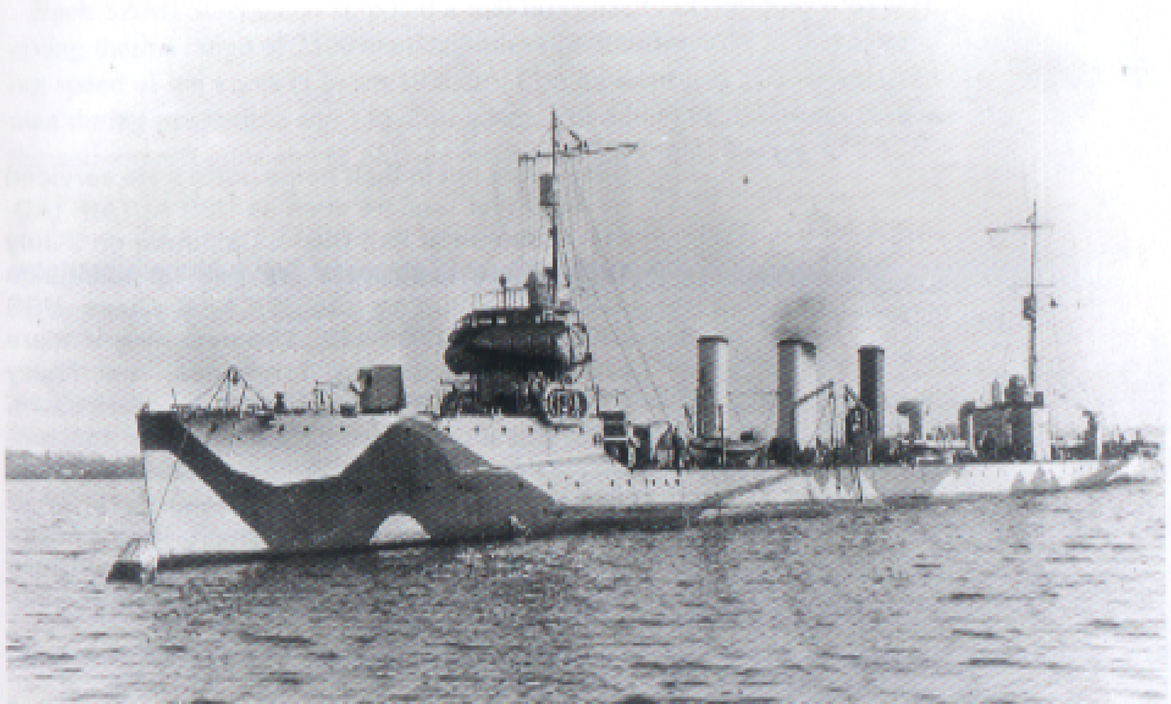
During the First World War, destroyers and other US warships were painted in various disruptive camouflage schemes. These schemes were called 'piebald' or 'splinter' and they were designed to confuse the enemy observer. The paint schemes consisted of blues and grays and they were utilized until the end of the war. Before the war, most destroyers were painted in either black or dark gray, with the thinking being that the darker colors would hide the ship at night. Tests in 1940 disproved that theory. Following World War One, US ships were painted in what has been called 'peace time gray,' a light gray color (approximately FS36320). Camouflage colors were reintroduced at the beginning of the Second World War, with much the same colors in new patterns.

The early destroyers did not carry hull (pennant) numbers; they were not introduced until the end of the First World War. They were first painted on either the bridge wings or on the hull below the bridge, so as not to be conspicuous. In the mid-1920s, large white hull numbers with black shading were painted on the bow. These large numbers were eliminated for security reasons in 1940, as the US neared active participation in World War Two.

The first of the major 'flush deck' destroyers – the so-called 'liberty' destroyers – were launched in 1917. They were built in two classes named **WICKES** (DD-75) and **CLEMSON** (DD-186). These vessels were designed as ocean escorts with a speed to keep up with the fastest of battle cruisers then in the design stage. Almost 300 of the WICKES and CLEMSON Classes were constructed and launched between 1916 and 1920. Those that survived scrapping in the mid-1930s went on to serve in the Second World War not only as destroyers (DDs), but also in other roles. These included high-speed light mine layers (DMs), high-speed minesweepers (DMSs), light seaplane tenders (AVPs and AVDs), and high-speed attack transports (APDs).

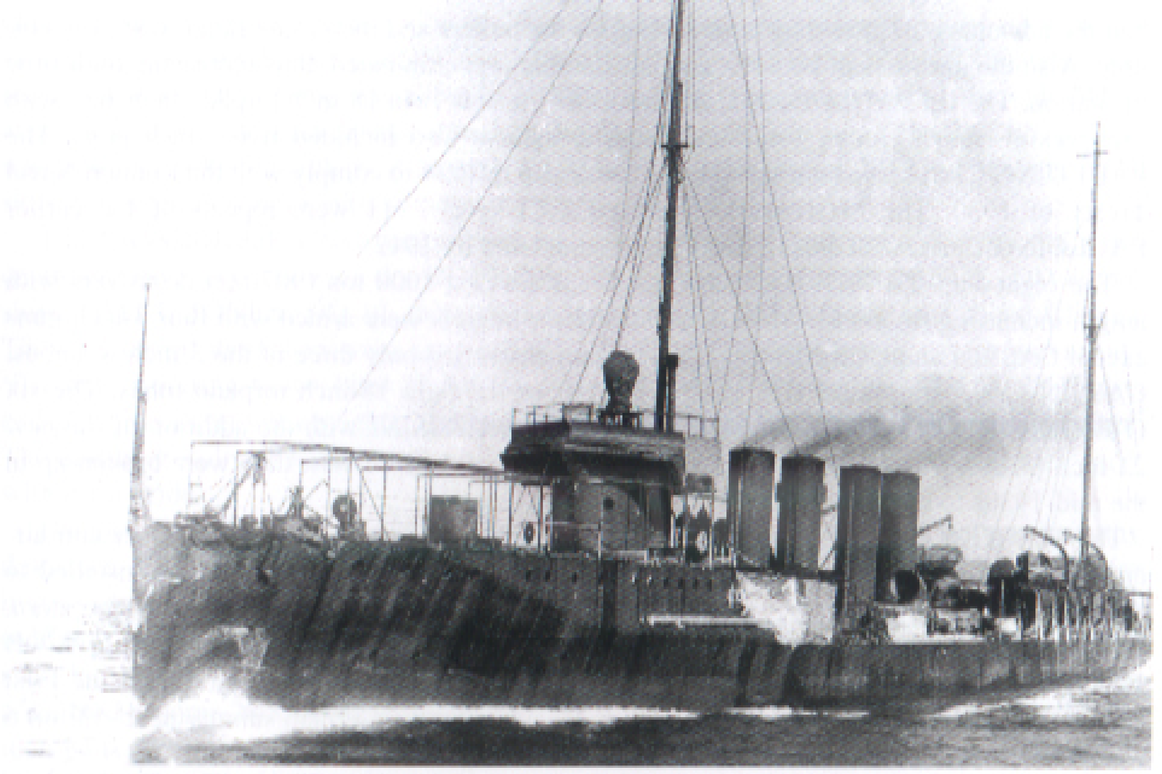
[2]The German term for submarine was *unterseeboot*, which they abbreviated to *U boot*. The British Anglicized this term to U-boat.

PERKINS (DD-26) was one of the ten PAULDING Class destroyers. This class had a high forecastle and their three forward guns were mounted in gun shields. It was fitted with three twin 18-inch torpedo tubes and a pair of depth charge roller tracks. The PAULDING Class were the first US destroyers to utilize oil as their primary fuel. PERKINS is camouflaged in a 'piebald' disruptive scheme that was introduced during the First World War. (Real War Photos)



The CASSIN Class ALYWIN (DD-47) followed General Board designs that emphasized high speed and range. This allowed it to operate with the new Battle Fleet being designed around the new battle cruisers. CASSIN Class destroyers displaced over 1000 tons (907 MT) and had a speed of 29 knots. Each ship except CASSIN and CUMMINGS was armed with four 3-inch/50 caliber guns and eight 18-inch torpedo tubes among four twin-tube launchers. The high fore and main masts were strung with wire for the recently installed radio equipment. Canvas covers the two guns mounted on each side of the forecastle to keep them dry. (Real War Photos)

WADSWORTH (DD-60) lies anchored in a safe harbor during the First World War. She is camouflaged in a disruptive scheme introduced during the conflict. WADSWORTH was a member of the TUCKER Class of 1915 and she served as the US Navy's destroyer flagship in British waters during the war. She was armed with four 4-inch/50-caliber guns and eight 18-inch torpedo tubes. (Real War Photos)



TUCKER (DD-57) was the leader in the new 1090-ton (989 MT) destroyer class introduced in 1915. She does not have her 4-inch guns fitted during her trials. Four Yarrow boilers powered TUCKER and a pair of Curtis turbines drove the two screws. The available 17,000 horsepower provided a maximum speed of 29.5 knots. (Real War Photos)

Destroyers not in their home ports were serviced by destroyer tenders such as USS ALTAIR (AD-11), anchored at San Diego, California on 7 July 1932. Three destroyers are tied up alongside ALTAIR, including the WICKES Class USS AARON WARD (DD-132). The destroyer tenders provided ammunition, torpedoes, machinery work, and fresh provisions to the destroyers. Fore and aft-mounted cranes enabled the tenders to easily transfer equipment and supplies between their vessel and the destroyers, or to and from the dock. These tenders would sortie to a safe area to provide the destroyers with a home away from home. (Real War Photos)

SAMPSON Class (DD-63 to DD-68)

The six-ship **SAMPSON** Class represented the last of the 1000 ton (907 MT) destroyers authorized by the US Navy in 1914. They had the characteristic high forecastle and four funnel design of these early vessels. All of the class were launched and commissioned in 1916.

Each SAMPSON Class vessel was 315 feet (96 M) in length, with a beam of 30 feet (9 M) and a draft rated at ten feet (3 M) under full load. Her displacement was 1100 tons (998 MT) standard and 1225 tons (1111 MT) full war load. Four Yarrow boilers furnished steam to the two Curtis turbines. The twin screws enabled the SAMPSON Class to achieve 29.5 knots (34 MPH/55 KMH) with 17,500 HP available. The first three vessels had their cruising turbines paired, one per shaft. The last three ships had a single cruising turbine that could be connected to one shaft, allowing the standard turbines to be shut down.

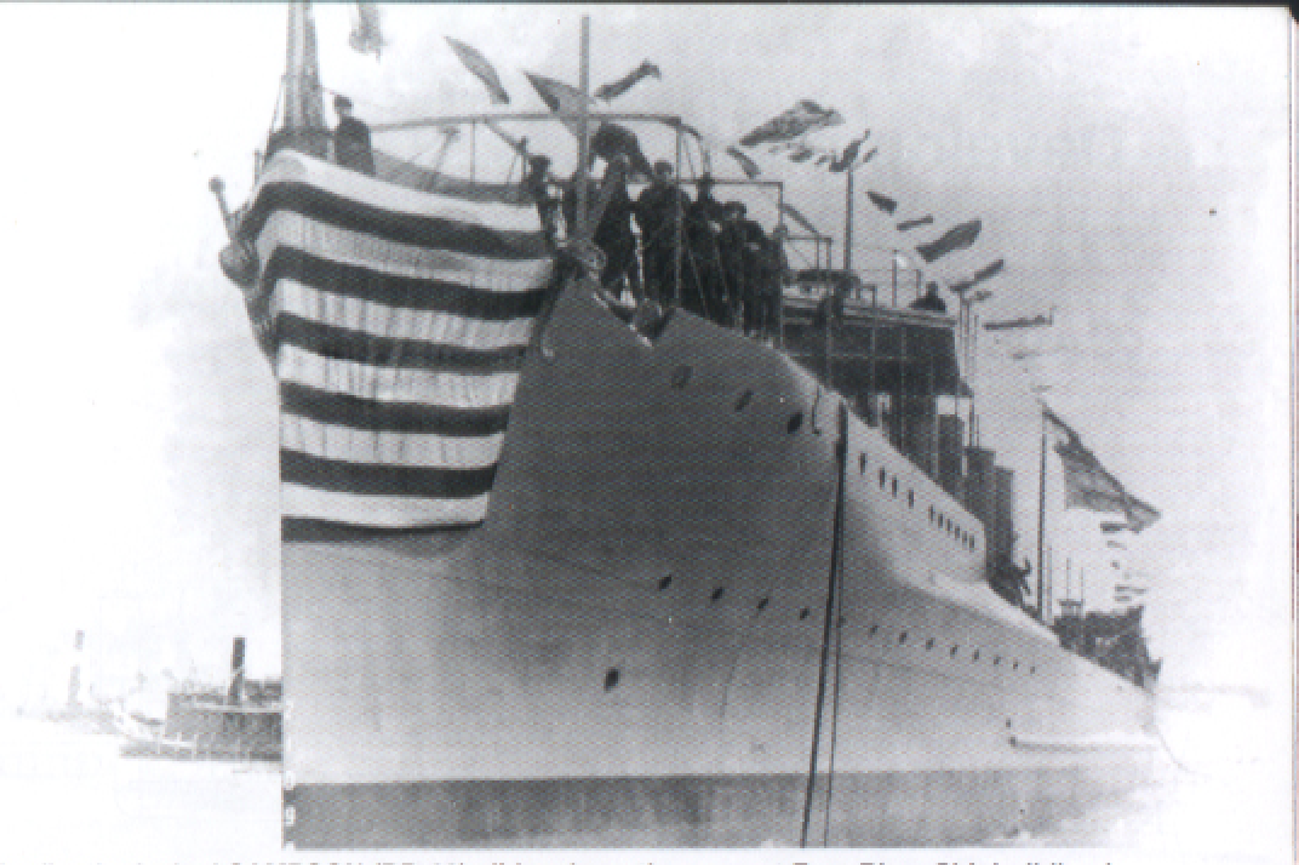
SAMPSON (DD-63) and ROWAN (DD-64) were constructed by Fore River Shipbuilding in Quincy, Massachusetts. Bath Iron Works in Bath, Maine built DAVIS (DD-65) and ALLEN (DD-66). WILKES (DD-67) was constructed by William Cramp and Sons in Philadelphia, Pennsylvania, while SHAW (DD-68) was built by Mare Island Naval Shipyard in San Francisco, California. Five of the six vessels were broken up by 1936 to comply with the 1930 London Naval Treaty. ALLEN remained and served during World War Two. She was the only non-'liberty' destroyer to serve in both major wars. Both ALLEN and SHAW served in the European Theatre from 1917 to 1918. ALLEN was based at Pearl Harbor, Hawaii during the Second World War.

This class was armed with four of the 4-inch (102MM)/50 caliber[1] guns which become standard on most early destroyers. These weapons were fitted in single open mounts, one each on the foredeck, the port and starboard amidships, and the quarterdeck. For anti-aircraft protection, a pair of 1-pounder (37MM) guns was fitted, one between the Number One 4-inch gun and the bridge and the other atop the deckhouse on the aft deck. Since their major role was clearing the sea lanes for the battle fleet, four 21 inch (533MM) triple torpedo tubes were stationed two to starboard and two to port on the amidships deck.

Each SAMPSON Class ship had a fuel oil capacity of 290 tons (263 MT), giving them a range of 2500 nautical miles (2879 miles/4633 KM) at a cruising speed of ten knots (12 MPH/19 KMH). Complement was 100 officers and men during peace time and 136 during war. The additional crew was to man the anti-aircraft guns and to provide additional back up to the crew.

The SAMPSON Class was the link between the old style high forecastle design of the early 1900s and the 'flush deck' design that would be prevalent until the mid 1930s.

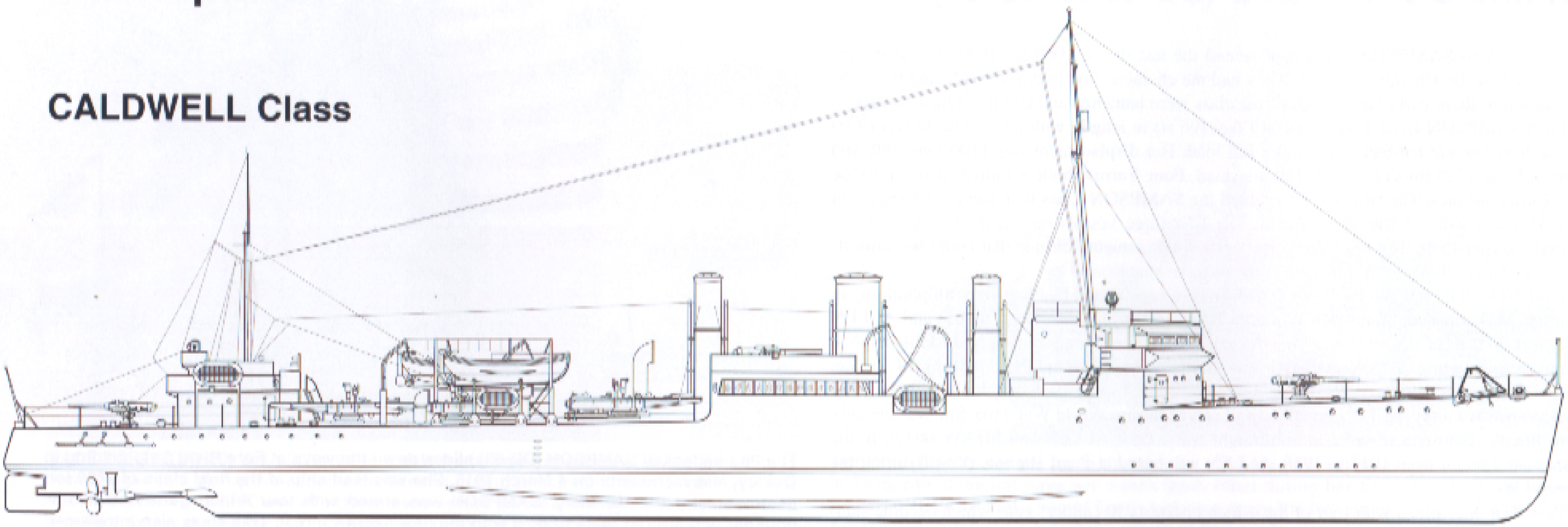
[1]Caliber in this instance referred to the gun barrel's length. The 4-inch/50 caliber gun had a barrel length equal to 50 times the 4-inch caliber, or 200 inches (508 CM).



The flag-bedecked SAMPSON (DD-63) slides down the ways at Fore River Shipbuilding in Quincy, Massachusetts on 4 March 1916. She was lead ship of the final class of 1000 ton destroyers for the US Navy. SAMPSON was armed with four 4-inch guns and two 1-pounder anti-aircraft guns to deal with the new aircraft threat. This class also introduced the triple 21-inch (533MM) torpedo tubes, which were fitted in four triple mounts. (Real War Photos)

ALLEN (DD-66) was the only pre First World War destroyer on the Naval Register at the end of the Second World War. She was laid up in the Reserve Fleet from 1922 until 1939, when she was recalled, recommissioned, and placed on active duty. ALLEN still carries her 4-inch guns and has been fitted with SC and SU radar antennas on the foremast. She is tied up alongside a US Navy destroyer escort (DE). ALLEN served until 1946, when she was sold for scrap and broken up. This made her the longest serving destroyer from the Class of 1914. (Real War Photos)

CALDWELL Class



WICKES and CLEMSON Classes

CALDWELL Class (DD-69 to DD-74)

The **CALDWELL** Class was the first of the 'flush deck' destroyers and they were used as test beds for the later mass-produced 'liberty' destroyers. Each of these six ships were 310 feet (94.5 M) in length at the water line and 315 feet (96 M) in overall length. Beam was 30 feet 6 inches (9.3 M) and draft was rated at nine feet (2.7 M). Displacement was 1125 tons (1021 MT) standard and 1190 tons (1080 MT) full load. Four Thornycroft boilers provided power to the steam turbines. The Cramp and Sons-built CONNOR (DD-72) and STOCKTON (DD-73) had three turbines and three screws, while the other four had twin turbines and screws. The Cramp-built ships and GWIN (DD-71) had three funnels with the two center stacks combined into one funnel. The available 18,500 HP made possible a speed of 32 knots (37 MPH/59 KMH). Her range with 300 tons (272 MT) of onboard fuel was 2500 nautical miles (2879 miles/4633 KM) at 15 knots (17 MPH/28 KMH).

The hull had a 'flush deck' with a straight sheer line from the bow to the cutaway stern. The sheer hull line and low forecastle lowered the ships' silhouette; however, she had the same freeboard at the bow as in earlier destroyer classes. This made for extremely wet conditions in high seas. Tall main and foremasts were fitted to carry the long wave and short wave radio antennas. The foremast also contained a crow's nest for the lookout.

Armament was the then-standard four 4-inch (102MM)/50 caliber main guns and two 1-pounder (37MM) anti-aircraft guns. Four 21-inch (533MM) triple torpedo tubes were placed on the deck amidships. CRAVEN (DD-70) and GWIN (DD-71) were also fitted with one 'Y' gun to throw depth charges out from the ship's side.

The class leader CALDWELL (DD-69) was constructed by Mare Island Shipyard, and CRAVEN (DD-70) by Norfolk Navy Yard in Norfolk, Virginia. GWIN (DD-71) was built by Seattle-Tacoma Shipyard (later Todd Shipbuilding) in Seattle, Washington. Cramp and Sons completed CONNOR (DD-72) and STOCKTON (DD-73), while MANLEY (DD-74) was fabricated by Bath Iron Works. DD-70's name was changed from CRAVEN to CONWAY in 1934, when the name CRAVEN was given to USS CRAVEN (DD-382), leader of a new single stack destroyer class. CALDWELL was broken up in 1936 and GWIN three years later to comply with the London Naval Treaty of 1930.

Great Britain and US entered into a lend-lease agreement in September of 1940, whereby the US would loan the British 50 destroyers. Three of these ships were from the CALDWELL Class. CONWAY (DD-70) became HMS LEWES (G.68), CONNOR (DD-72) HMS LEEDS (G.27) and STOCKTON (DD-73) HMS LUDLOW (G.57). All the ships were placed in the TOWN Class, which honored town names in the United States that were also found in Great Britain and Canada.

MANLEY (DD-74) became the prototype for the fast attack transport (APD). Upon the completion of the conversion in 1938, she was redesignated AG-28. This conversion included removing two of her boilers and stacks to make room for an embarked company of Army or Marine amphibious assault troops. Four gravity boat davits were fitted for Landing Craft, Vehicle Personnel (LCVP) or Landing Craft, Personnel (LCP). LCPs were either of two types: the Landing Craft, Personnel (Large) – LCP(L) – or the Landing Craft, Personnel (Ramp) – LCP(R).[1] The four torpedo tubes were removed to make way for the davits and MANLEY was equipped with a pair of depth charge roller tracks on the stern and 'K' gun depth charge throwers to port and starboard. MANLEY joined Destroyer Division 32 with the Atlantic Fleet at Norfolk, Virginia.

The experimental CALDWELL Class served as prototypes for the mass-produced 'liberty' destroyers of 1916-1918, with many of the features being carried over to the WICKES and CLEMSON Classes.

USS CALDWELL (DD-69) was the first of the famous 'flush deckers' that began entering service in 1918. They bridged the gap between the 1000 tonners and the later WICKES and CLEMSON Classes of mass-produced 'liberty' destroyers. CALDWELL is camouflaged in a splotched scheme that appears to be blue and gray. She was armed like her predecessors with four 4-inch guns and twelve 21-inch torpedo tubes in four triple mounts. (Real War Photos)

STOCKTON (DD-73) is berthed in a British port during the First World War. She is camouflaged in a 'splinter type' of paint scheme that consisted of Navy Blue, Haze Gray, and Light Gray. She was one of three CALDWELL Class destroyers loaned to Great Britain under a lend-lease arrangement in 1940. STOCKTON was renamed HMS LUDLOW (G.57) and placed in the Second Group of the TOWN Class. She served in the Royal Navy until scrapped on 5 July 1945. (Real War Photos)

WICKES Class (DD-75 to DD-185)

The WICKES Class of 1916-1917 and the later CLEMSON Class of 1917-1918 were the most widely produced US warships of any class until the Second World War. That was when the US Navy began producing Destroyer Escorts (DE) and Destroyers (DD) for the war effort.

The WICKES (DD-75) Class relied heavily on the earlier CALDWELL Class of 1915 with improvements in both speed and seaworthiness. The increased speed to 35 knots (40 MPH/65 KMH) and in some cases 40 knots (46 MPH/74 KMH) came about with the increase in horsepower to 24,500 versus 18,500 for the CALDWELLs. Seaworthiness improvements included a level keel and turbine and propeller shafts with a near horizontal arrangement.

There were two basic designs for the WICKES Class. One was by Bath Iron Works in Bath, Maine, while the other was at Bethlehem Steel's Fore River Shipyard in Quincy, Massachusetts. The differences were in design of the bridge superstructure and the machinery (boilers and turbines) chosen. The boilers that were chosen were Yarrow, White-Foster, Normand, and Thornycroft, while Westinghouse, Curtis, and Parsons supplied the turbines. The Parsons turbines featured a cruising turbine geared to the port propeller shaft.

Seven shipyards built the WICKES Class vessels. They were: Bath Iron Works; Fore River (Bethlehem Steel), Quincy, Massachusetts; William Cramp and Sons, Philadelphia, Pennsylvania; Newport News Shipbuilding in Newport News, Virginia; New York Shipbuilding in Camden, New Jersey; Norfolk Naval Shipyard in Norfolk, Virginia; and Mare Island Naval Shipyard, San Francisco, California. The class leader WICKES (DD-75) was launched from Bath Iron Works on 25 June 1918 and the last of the class, BAGLEY (DD-185), was launched from Newport News Shipbuilding on 19 October 1918.

Dimensions on the WICKES Class were 310 feet (94.5 M) at the waterline and 314 feet (95.7 M) overall. Her beam was 30 feet 10 inches (9.4 M) and draft was 9 feet 6 inches (2.9 M). Displacement was rated at 1090 tons (989 MT) standard and 1294 tons (1174 MT) full war load. The ship's complement was 123 officers and enlisted sailors.

The WICKES Class was armed with four of the 4-inch/50 caliber Mk 9 guns, which had a range of 16,200 yards (14,813 M) at 20° elevation. The Number One gun on the forecastle was provided with either a curved or flat shield on some ships, while the other three weapons – two amidships to port and starboard, and the third on the quarterdeck – were unshielded. The 4-inch gun was a single purpose mount that could fire a common round or a star shell (illuminating) round. Secondary armament consisted of two 3-inch (76MM)/23 caliber guns and two 1-pounder (37MM) guns for anti-aircraft protection. Four 21-inch (533MM) triple torpedo tubes were fitted amidships, two each to port and to starboard.

The WICKES Class' range varied from ship to ship, depending on the boiler/turbine combination. The Bath-built vessels with the White-Foster boilers and Parsons geared turbines exhibited the best range at approximately 3200 nautical miles (3685 miles/5930 KM) at 20 knots (23 MPH/37 KMH). The Fore River-built ships with their Yarrow boilers and Curtis turbines had the lowest range, only 2300 nautical miles (2648 miles/4262 KM) at 20 knots. Each WICKES Class destroyer was provided with over 300 tons (272 MT) of fuel oil.

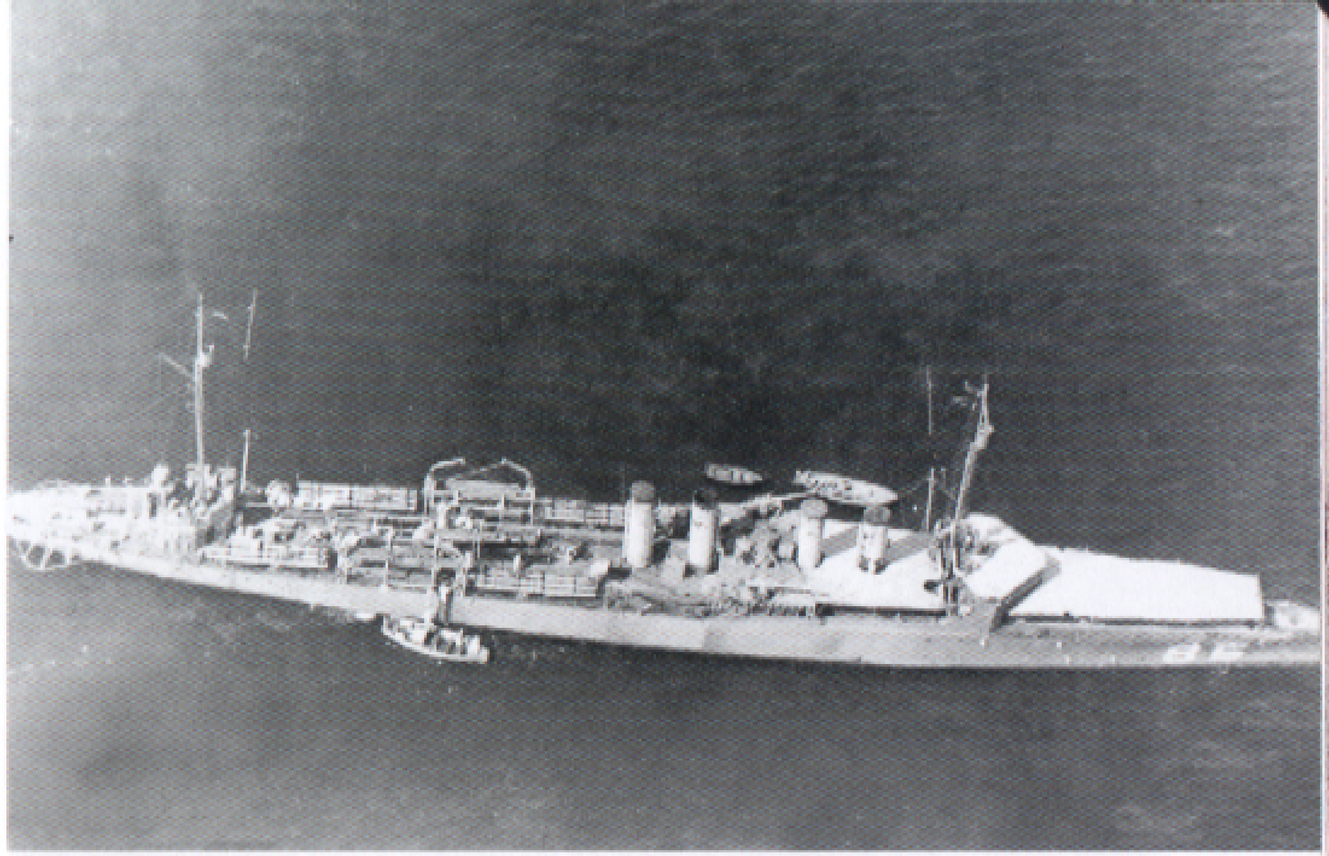
Following the First World War, the US Navy placed many WICKES Class destroyers into the Naval Reserve Fleet. Fourteen ships (DD 96-102, 110-112 and 171-174) were converted to high-speed minelayers and designated DMs in 1920. These vessels were all stricken between 1930 and 1937.

In the 1930s, over 100 'flush deck' destroyers were removed from the Naval Register to com-

USS WICKES (DD-75) was the leader of a class that eventually numbered 111 ships. She was one of 50 flush deckers sent to Britain in 1940. In British service, WICKES was named HMS MONTGOMERY (G.95) and placed in the Third Group of the TOWN Class. She was loaned to the Royal Canadian Navy in 1942 and served until March of 1945, when she was scrapped. The WICKES Class was basically a 35-knot version of the earlier CALDWELL Class. (Elsilrac)

PHILIP (DD-76) cruises through the Panama Canal in the 1930s. She is finished in the between wars peacetime Light Gray scheme. The tall masts support the long wire antennas for the short wave radio equipment. PHILIP was also loaned to the British and renamed HMS LANCASTER (G.05) and placed in the Third Group of the TOWN Class. She served until she was scrapped in 1947. (Real War Photos)

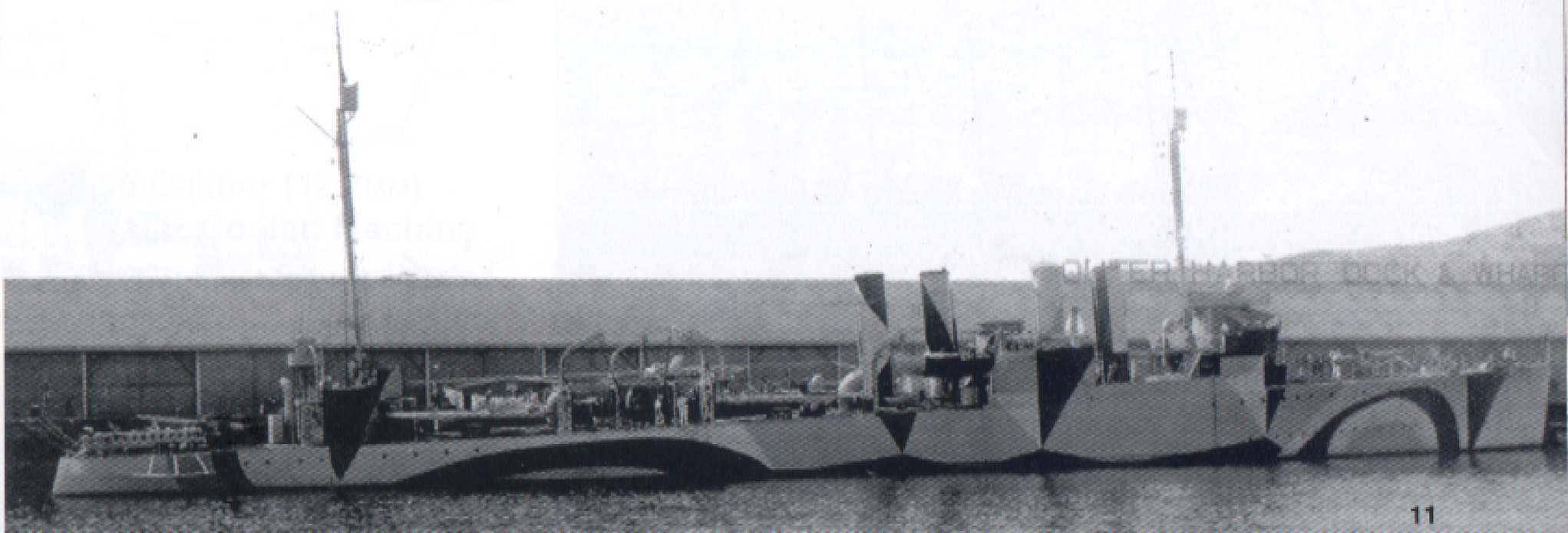
RINGGOLD (DD-89) was launched in time to see service during the First World War. She is painted in one of the many disruptive schemes employed by US destroyers of that time. Her bridge configuration differs from that of her sister ship PHILLIP. RINGGOLD was loaned to the British and renamed HMS NEWARK (G.08) in 1940. This vessel served in the Royal Navy until 1947, when she was scrapped. (Real War Photos)



Only the Number Three boiler (third from front) aboard STEVENS (DD-86) is operating, while covers are placed over the other three stacks. The launching of all her boats indicates a shore leave in progress. Her four triple 21-inch torpedo tubes are staggered amidships on the deck. (Real War Photos)

ply with various Naval Treaties that concerned destroyer tonnage. The destroyers chosen were ones equipped with the less efficient Yarrow boilers or units that had sustained some damage while in service. The balance of the WICKES Class that survived the scrapper's torch went on to serve as destroyers, or were converted to seaplane tenders (AVPs), minelayers (DMs), or fast minesweepers (DMSs). Many were loaned to Britain for service in the Royal Navy during World War Two.

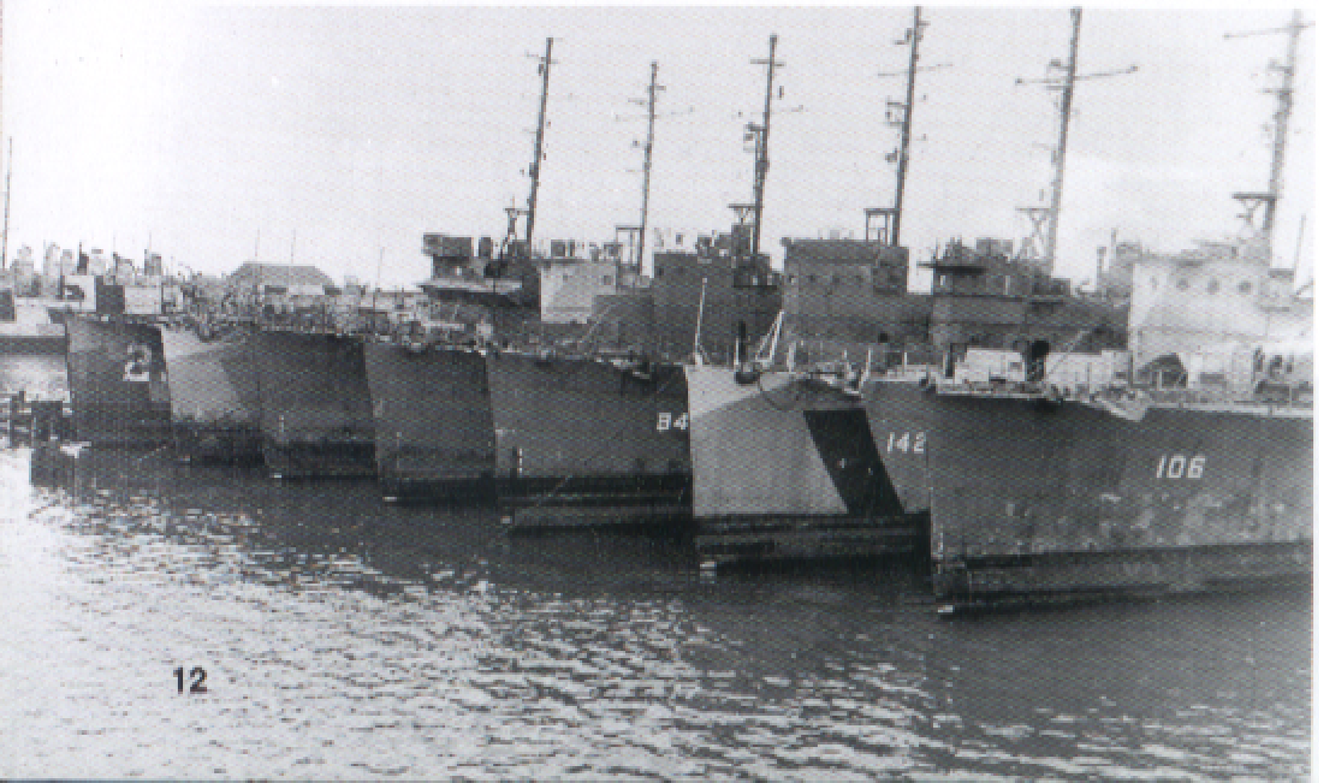
SCHLEY (DD-103) is painted in yet a different paint scheme during the First World War while tied up at the pier of the Outer Harbor Dock & Wharf Company in San Pedro, California in 1918. The propeller guard extending from the aft hull kept objects away from the ship's propeller below it. She was constructed by Union Iron Works in San Francisco, California and launched on 28 March 1918. Following the end of the war, SCHLEY was laid up in the Reserve Fleet until recalled to serve in another war twenty years later. She served until she was scrapped in 1945. (Elsilrac)



SCHLEY (DD-103) was repainted in peacetime Light Gray immediately following the First World War. The hull number 103 appears on the upper hull, just below the bridge area. WICKES Class destroyers were 314 feet (95.7 M) long and had a beam of 30 feet 10 inches (9.4 M). Armament was four 4-inch (102MM)/50 caliber guns and two 3-inch (76MM)/23 caliber anti-aircraft guns. One of the latter is located between the Number One 4-inch gun and the bridge superstructure. (Real War Photos)

CHEW (DD-106) was one of the many flush deckers that were modified for escort duty during World War Two. The modifications included removing one or two boilers and a pair of torpedo tubes. Further modifications included adding depth charge roller racks and tracks, 'K' guns, and 20MM anti-aircraft guns. CHEW had one boiler removed, which lowered her speed; however, the space was used for additional fuel storage that increased her cruising range. (Elsilrac)

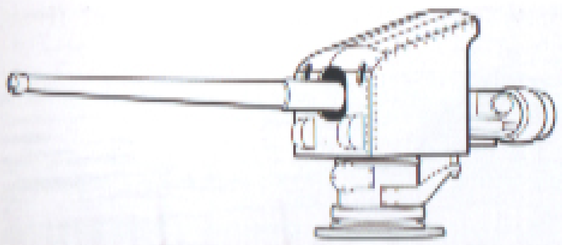
When World War Two ended, all of the flush deck destroyers were demilitarized with the removal of all weapon systems and radar and radio equipment. Most were scrapped, but some were sold and used in such civilian roles as freighters and even high speed banana boats. CHEW (DD-106), TARBELL (DD-142), BELKNAP (APD-34, ex-DD-251,) and five other destroyers await their fate at Naval Air Station (NAS) Cape May, New Jersey on 24 November 1945. These vessels had different styles of bridges. (Real War Photo)



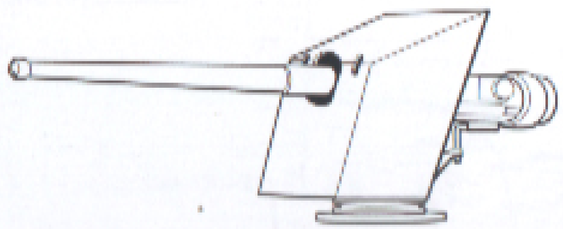
DENT (DD-116) was built by Cramp and Sons Shipbuilding and launched on 23 March 1918. She is camouflaged in a splinter scheme used during the First World War. The hull number was painted on the side sheeting. Her 1-pounder (37MM) anti-aircraft gun is positioned between the Number One 4-inch gun and the bridge area. DENT was reconfigured as a High Speed Attack Transport and designated APD-9 in 1942. Following her conversion to APD, she was used to land US Army and Marine troops on Pacific Islands. (Real War Photos)

BREEZE (DD-122) steams following her launching from Newport News Shipbuilding on 11 May 1918. She is painted in a dark gray scheme with large hull numbers on her bow. Her Number Four 4-inch gun was repositioned from the aft deck to the aft deckhouse. This freed up deck space for depth charge roller tracks. BREEZE was converted to a light minelayer and redesignated DM-18 in 1931. She served in that capacity through World War Two and was broken up in 1946. (Real War Photos)

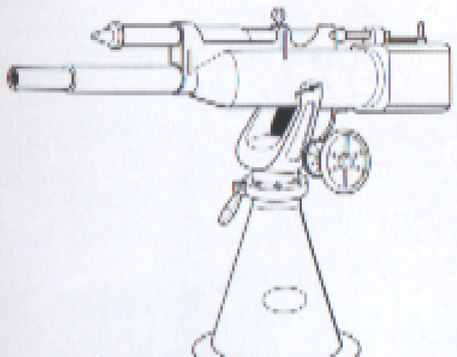
4 inch (102mm)/50 Calibre Gun with Curved Shield



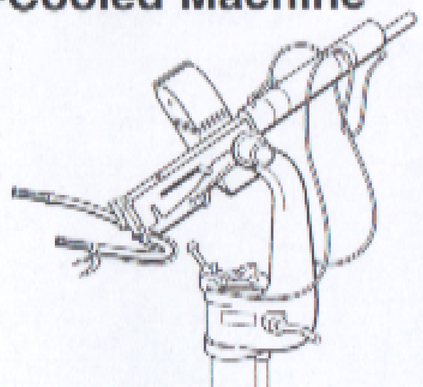
4 inch/50 Calibre Gun with Angled Shield

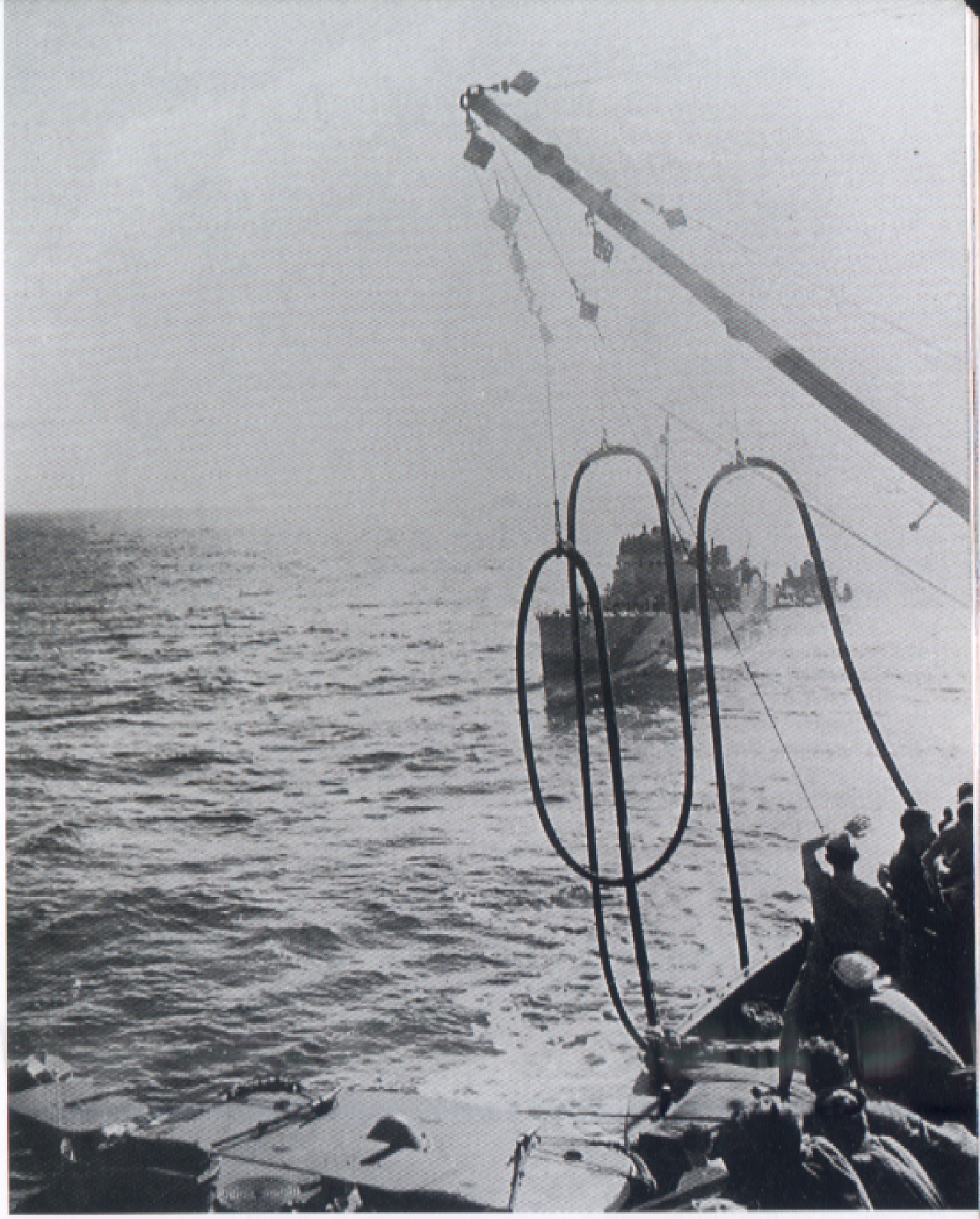


3 inch (76mm)/23 Calibre Anti-Aircraft Gun



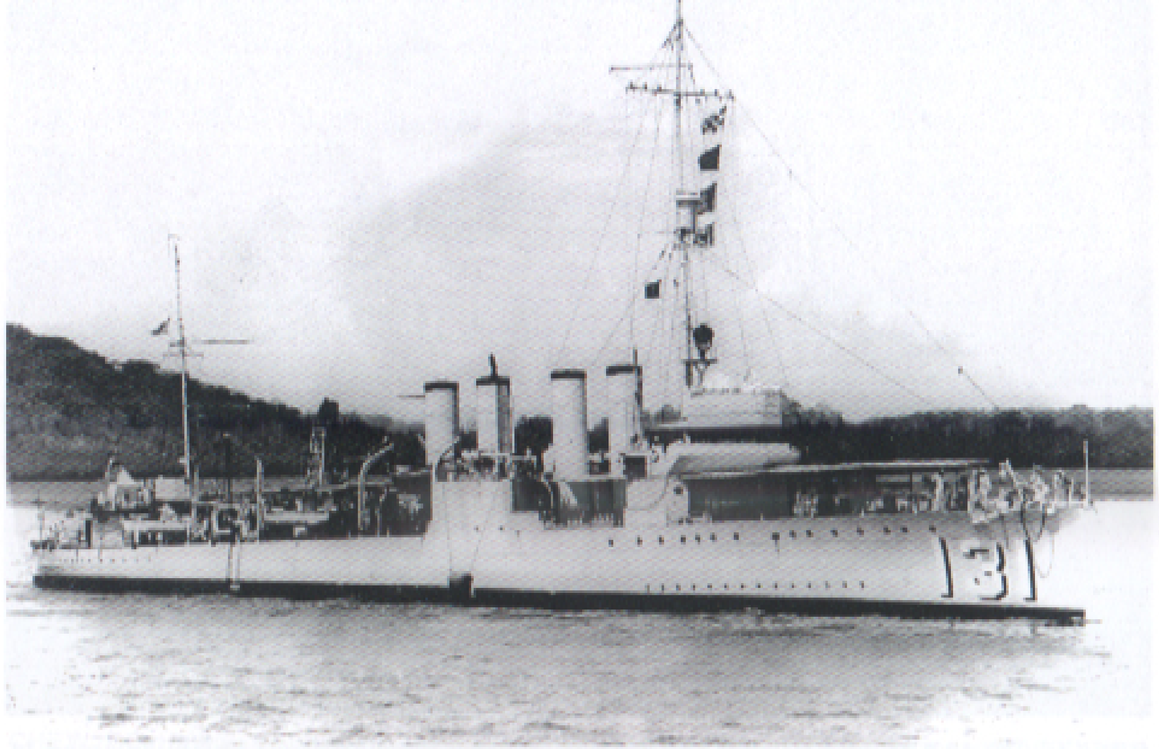
.50 Caliber (12.7mm) Water-Cooled Machine Gun





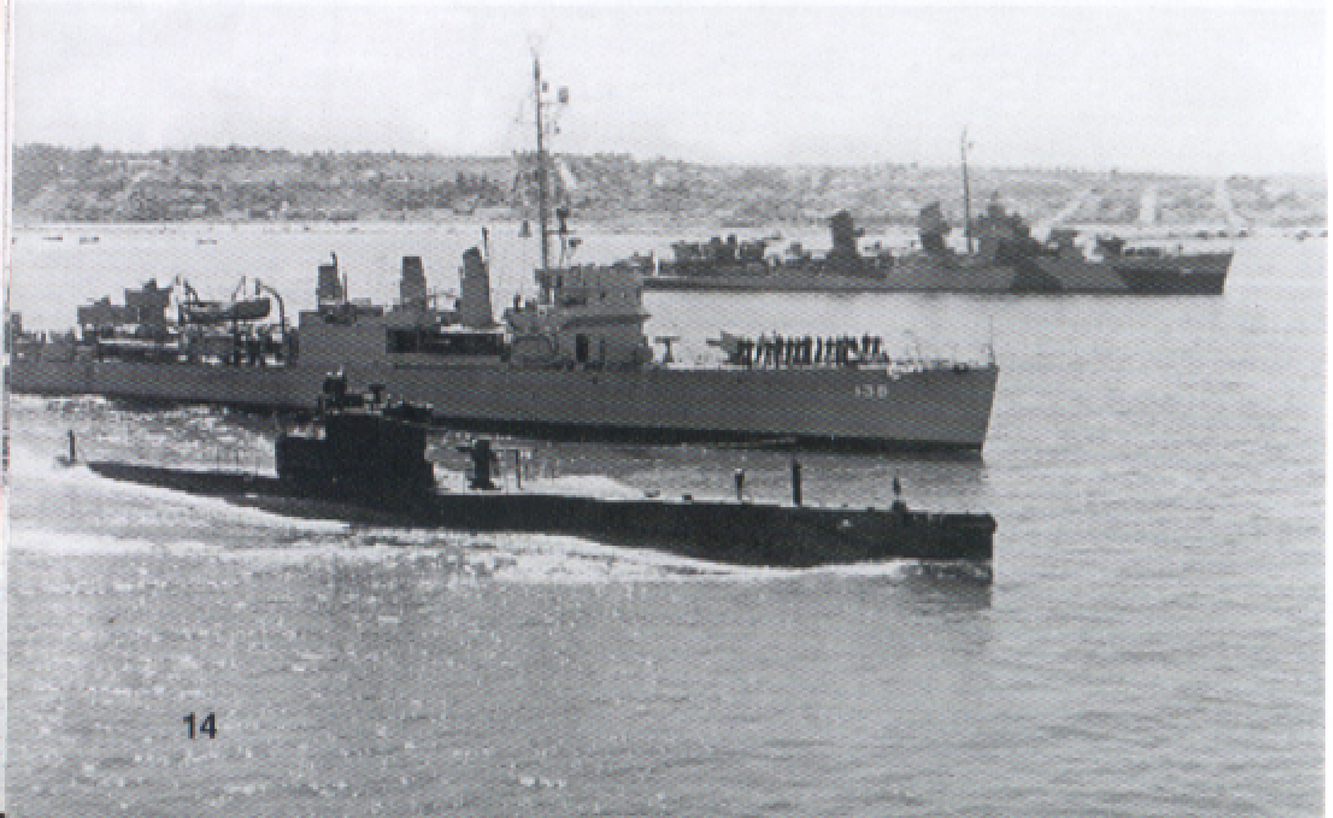
GAMBLE (DM-15, ex-DD-123) pulls up alongside the attack transport CARTERET (APA-70) to take on fuel on 6 February 1945. Suspended fuel hoses were lowered from CARTERET to transfer fuel oil to the other vessel. GAMBLE had been reconfigured to a light minelayer and designated as DM-15 in 1930. It was in this configuration that she was attacked by a Japanese *kamikaze* (suicide aircraft) off Iwo Jima on 18 February 1945. She survived the attack, but US forces towed her to Saipan and scuttled GAMBLE. (Real War Photos)

Smoke belches out of the Number Two stack on RAMSAY (DD-124) in the 1920s. The fore and aft canvas awnings were deployed to help keep the deck cooler. RAMSAY was converted to a light minelayer and redesignated DM-16 in 1930. She served in that capacity until she was broken up in 1946. (Real War Photos)

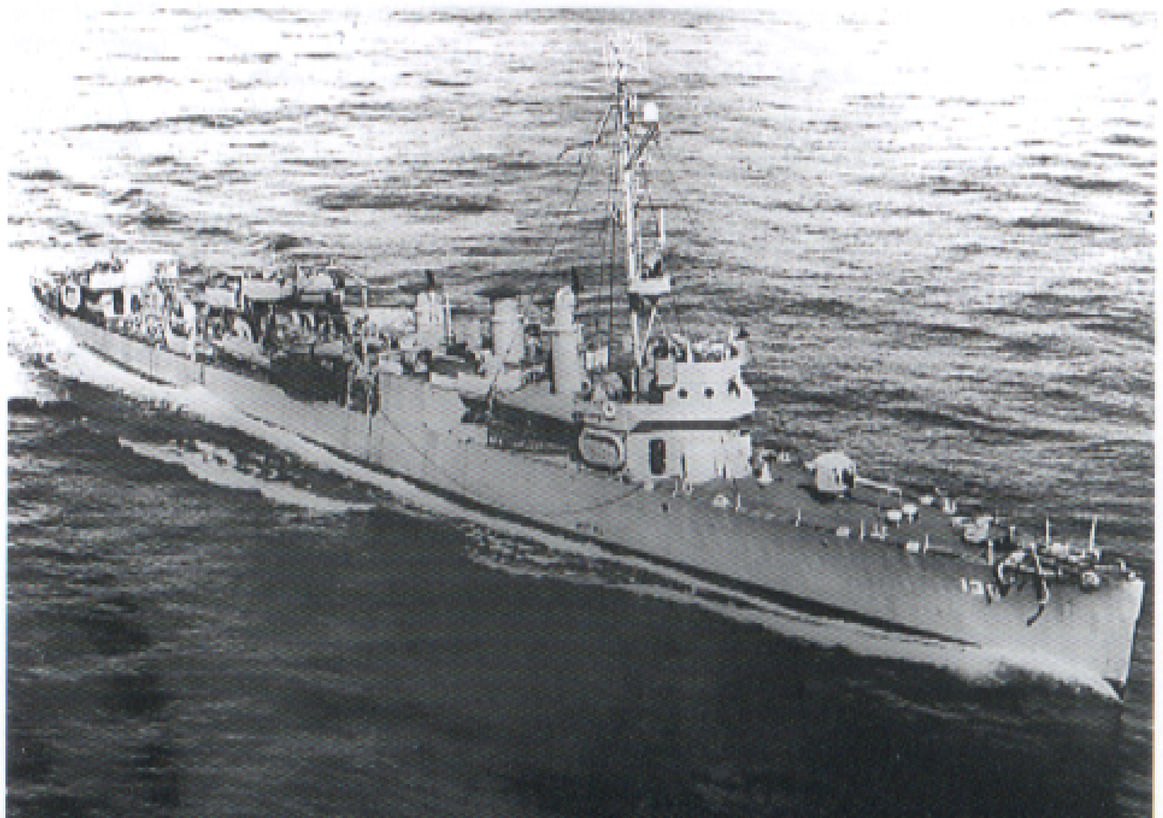


BUCHANAN (DD-131) was built by Bath Iron Works in Bath, Maine and launched on 2 January 1919. She was loaned to Great Britain in 1940 and renamed HMS CAMPBELTOWN (I.42) and placed in the Third Group of the TOWN Class. CAMPBELTOWN was configured to appear as a German MÖWE Class torpedo boat for the raid on the locks at St. Nazaire, France on 28 March 1942. (Floating Dry Dock)

KENNISON (DD-138) is flanked by a 'R' Class submarine and a FLETCHER Class destroyer. KENNISON is painted in Measure 14, the Haze Gray System, with white hull numbers on the bow. Her sailors man the rails in an old Navy tradition of respect. KENNISON was constructed by Mare Island Navy Shipyard and launched on 8 June 1918. After almost thirty years of service, she was broken up in 1946. (Real War Photos)



KENNISON (DD-138) was reconfigured as an ocean escort with the removal of one boiler and a pair of 21-inch (533mm) torpedo tubes. Depth charge roller tracks were installed and her anti-aircraft armament was increased with the addition of six 20mm cannon. SU and SA radar antennas were added to the main mast. KENNISON retained her 4-inch main armament. (Floating Dry Dock)



WARD (DD-139) was built by Mare Island Shipyard in just seventeen and one half days and launched on 1 June 1918. She had captured a world record for shipbuilding and following a short work-up period she turned in a speed of 37 knots. WARD became famous for sinking a Japanese midget submarine at the entrance of Pearl Harbor, Hawaii on the early morning of 7 December 1941, prior to the Japanese air attack. She was converted to a high-speed attack transport and designated APD-16 in 1943. WARD was sunk by a Japanese *kamikaze* off Leyte, the Philippines on 7 December 1944. (Floating Dry Dock)

TARBELL (DD-142) steams alongside an unidentified ship to take on fuel oil in the early 1930s. She is painted in Measure 3, the Light Gray System, with black shaded white bow numbers. Funnel tops and the waterline boot topping are black. TARBELL was constructed by Cramp and Sons Shipbuilding and launched on 28 May 1918. She served during World War Two and was broken up in 1945. (Real War Photos)

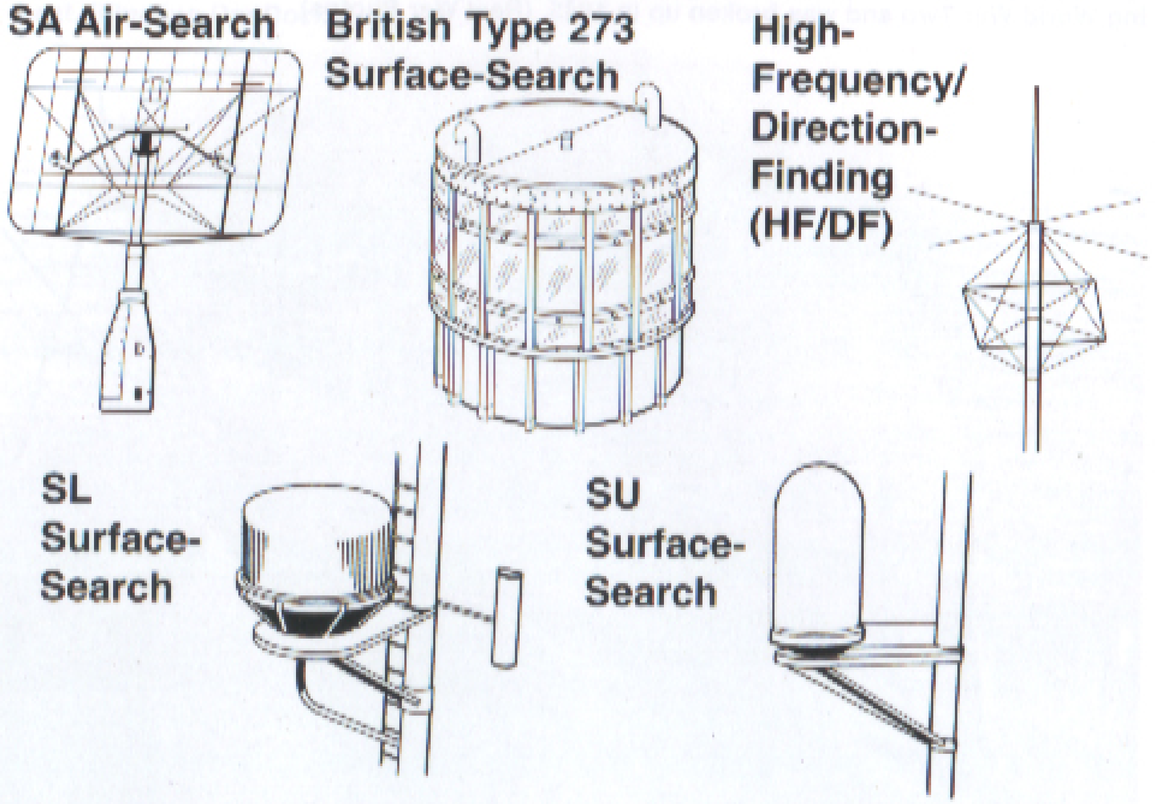
The US Navy loaned USS UPSHUR (DD-144) to the US Coast Guard (USCG), which renumbered it CG-15 in the 1920s. During Prohibition, the USCG – then under the Treasury Department – was charged with stopping vessels nicknamed 'rum runners' from smuggling illegal liquor into the US. UPSHUR served the USCG until Prohibition was repealed and alcohol became legal again in 1933. She was then placed in reserve until recalled for duty in the Second World War. (USCG)

UPSHUR (DD-144) enters Charleston Navy Yard, South Carolina on 12 April 1945, following an anti-submarine patrol in the Atlantic. She was modified with the removal of one boiler and a pair of 21-inch torpedo tubes. The four 4-inch guns were removed and replaced by six 3-inch guns. Two of the latter now occupy the former position of the torpedo tubes. An auxiliary diesel generator was added to provide additional electric power for the added electronic gear installed. Its stack is mounted just forward the Number Three stack. SA air-search and SU surface-search radars are fitted on the foremast and a High Frequency/Direction-Finding (HF/DF) antenna is fitted to the auxiliary main mast. (Real War Photos)

The damaged BLAKELY (DD-150) enters Martinique, St. Lucia, West Indies following a submarine attack in the Caribbean in May of 1942. After the fitting of a temporary bow, she sailed to Philadelphia Navy Yard, Pennsylvania, where she was fitted with the bow of the decommissioned TAYLOR (DD-94). BLAKELY is finished in Measure 4, the Black System. It was discovered that this System was found to actually highlight the ships and it was discontinued in mid-1942. (Real War Photos)

BRECKENRIDGE (DD-148) leaves Boston Navy Yard, Massachusetts on 8 March 1945. She has received the ocean escort modifications of the removal of one boiler and a pair of torpedo tubes. The 'bandstand' at the base of the main mast contains two 20MM cannon. A HF/DF ('Huff/Duff') antenna used for locating submarines broadcasting on their radios is fitted on BRECKENRIDGE's aft mast. (Real War Photos)

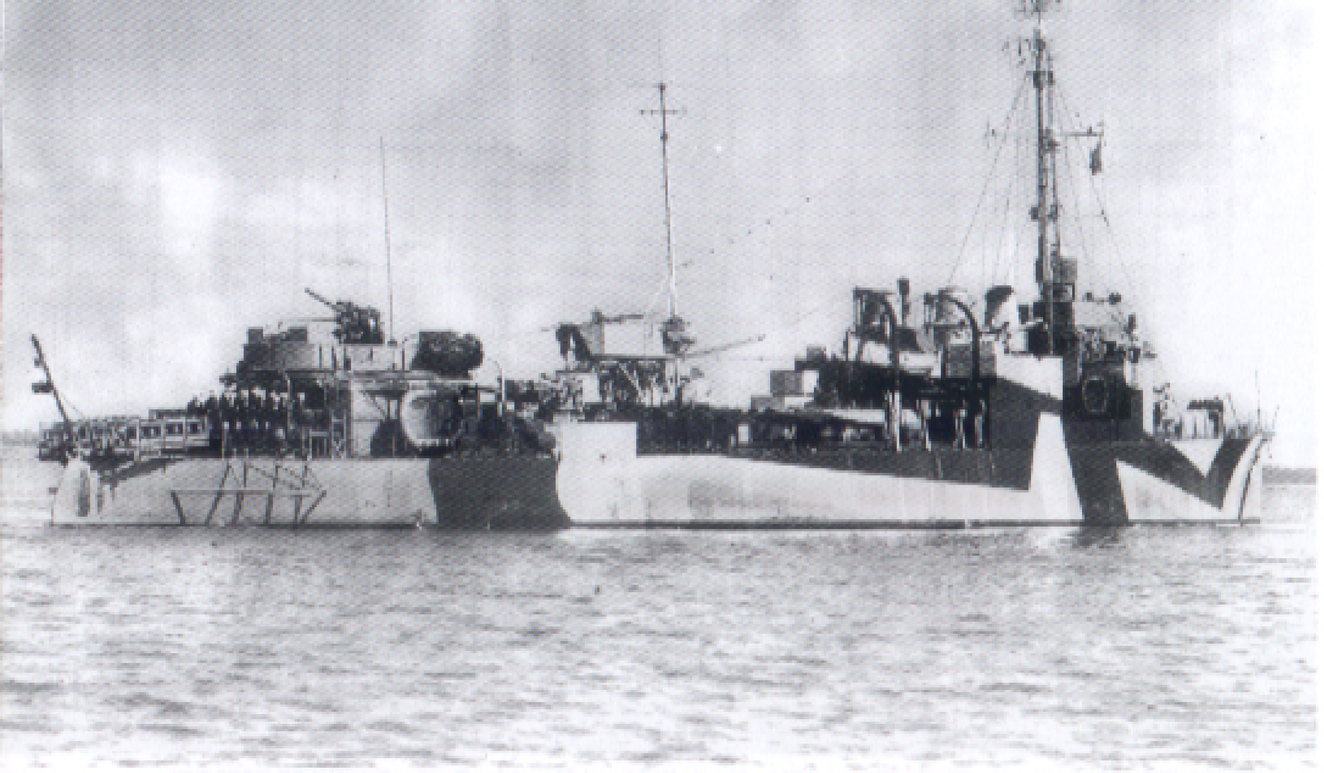
Radar and Direction Finder Antennas



The crew of BLAKELY (DD-150) expresses their delight in surviving the U-Boat attack in the Caribbean Sea off St. Lucia, West Indies by waving to the photographer. Most of her crew is on deck in case it became necessary to abandon the damaged ship. The ship's damage control party did their job and BLAKELY survived to fight again. She is not fitted with any radar equipment or electronic equipment. (Real War Photos)

DU PONT (DD-152) sits in the harbor at the Norfolk Navy Yard in Portsmouth, Virginia on 21 August 1942. She and her crew were awarded the Presidential Unit Citation for her role in sinking German U-Boats in the Atlantic in 1943. DU PONT is camouflaged in a modified Measure 12, but is being changed to Measure 31/3D. She was modified for ocean escort duties, which increased her range at the expense of speed. (Floating Dry Dock)

DU PONT (DD-152) was converted to an auxiliary ship and re-designated as AG-80 on 25 September 1944. She was stripped of all guns and used to refuel ships in and around the US Navy Yard, South Carolina (Charleston). DU PONT is camouflaged in measure 31/3D, the Graded System used by many destroyers during the war. The fore-mast is fitted with SC air-search (top) and SU surface search radar antennas. The SC was derived from the earlier CXAM and SA radars. (Real War Photos)



BERNADOU (DD-153) is equipped with stern-mounted depth charge roller racks, track, and amidships located 'K' guns. Her four 4-inch guns were replaced by six 3-inch guns to increase anti-aircraft protection. The HF/DF antenna atop her main mast was used to locate German U-Boats on the surface and using their radio to communicate with home base. SA and SU antennas are fitted to the foremast, along with the British Type 273 'lantern' radar antenna at the mast's base. BERNADOU is camouflaged in measure 31/3D. (Floating Dry Dock)

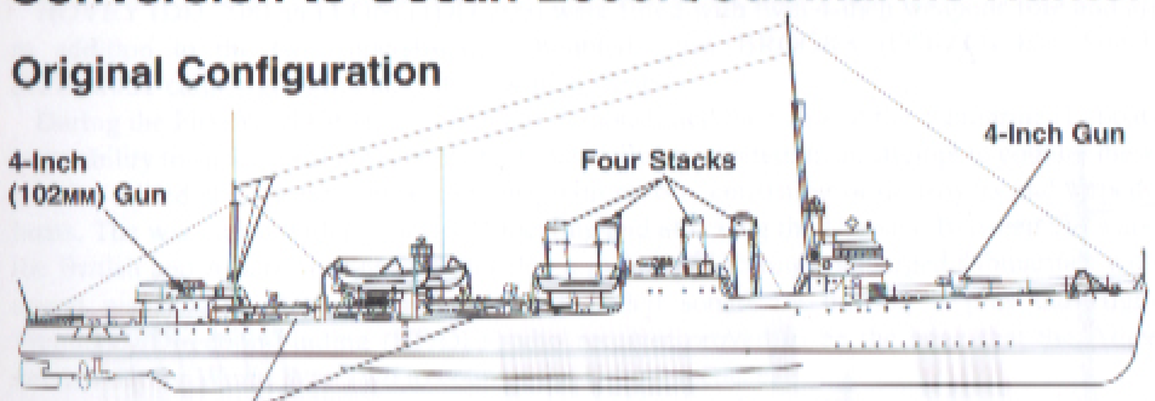
ELLIS (DD-154) is painted in Measure 22, the Graded System, on 30 December 1943. She was built by Cramp and Sons Shipbuilding and launched on 30 November 1918. ELLIS was modified with the removal of her 4-inch guns and replacement by six 3-inch guns. Several 20MM cannon are placed atop the bridge area, the central superstructure, and on a 'bandstand' at the base of the main mast. The foremast is fitted with SC air-search (top) and SL surface-search radars. All of the gun mounts are shielded to reduce splinter intrusion. (Real War Photos)

COLE (DD-155) was launched from Cramp and Sons Shipbuilding's Philadelphia yard on 1 November 1919. This was too late to see action in the First World War, but she saw much action in World War Two. COLE and her sister BERNADOU (DD-153) attacked the dock at Casablanca, French Morocco during the Allied invasion of North Africa in November of 1942. COLE returned to the US following this successful attack and was modified to ocean escort configuration in 1943. She is camouflaged in Measure 31/3D. (Real War Photos)

BADGER (DD-126) was launched from New York Shipbuilding's Camden, New Jersey yard on 14 August 1918. After brief active service, she entered the Atlantic Fleet Reserve Squadron in 1922. BADGER was pulled out from the Reserve Fleet and overhauled for duty in the Active Fleet in 1939. By 1944, she was configured for ocean escort duty and camouflaged in Measure 22, the Graded System of Haze Gray (approx. FS35237) above Navy Blue (approx. FS35044). (Real War Photos)

Conversion to Ocean Escort/Submarine Hunter

Original Configuration



After Conversion

LEARY (DD-158) was the first US Navy ship equipped with radar. Under a blanket of secrecy, a new radio detection and ranging (radar) device was installed at the Philadelphia Navy Yard in 1937. LEARY consequently became the first US ship to detect a surfaced U-Boat in the Atlantic. U-275 fired a GNAT homing torpedo at LEARY in the North Atlantic on 24 December 1943. The torpedo struck her starboard side engine room area and caused severe damage. She floundered and soon sank from the torpedo hit, with the loss of 98 lives. LEARY is camouflaged in Measure 22, the Graded System. (Real War Photos)

De Havilland DH-4 aircraft fly over RIZAL (DD-174) during exercises in early 1920. She was built with Philippine funds and operated for a time with a Philippine crew. RIZAL was bought back by the US Navy and converted to a Light Mine Layer and designated DM-14 in 1920. She was broken up in 1932, in accordance with the 1930 London Naval Treaty. (Elsilrac)

The crew of WALKER (DD-163) prepare to man the rails in the early 1920s. She was decommissioned and placed in reserve in 1922. WALKER was stricken from the Navy list in 1938, but was recalled and converted to a water barge designated YW-57 one year later. Redesignated IX-44, she was scuttled as a damage control hulk off San Diego on 28 December 1941. (Real War Photos)

Five of the WICKES Class flush deck destroyers await the scrapper's torch at NAS Cape May, New Jersey in October of 1945. These vessels are (from left): GREER (DD-145), the second BAINBRIDGE (DD-246), PRUITT (DM-22, ex-DD-247), BADGER (DD-126), and LEA (DD-118). The ships display a wide variance in both bridge design and paint schemes. (Real War Photos)

CLEMSON Class (DD-186 to DD-347)

The CLEMSON Class of 1917-1918 was the second class of the 'liberty' destroyers for the US Navy. The CLEMSONs were basically WICKES Class ships with increased fuel storage for greater range.

The CLEMSON Class was 310 feet (94.5 M) in length at the water line and 314 feet (95.7 M) in overall length with a beam of 30 feet 10 inches (9.4 M). Draft increased from 9 feet 6 inches (2.9 M) to 9 feet 10 inches (3 M), due to their increased tonnage. The standard displacement of 1090 tons (989 MT) was unchanged from the earlier WICKES Class ships; however, the CLEMSON Class' full load displacement increased from 1294 tons (1174 MT) to 1310 tons (1188 MT). Fuel storage was increased from 300 tons (272 MT) to 400 tons (363 MT). This increased the range from 2300 nautical miles (2648 miles/4262 KM) to 2500 nautical miles (2879 miles/4633 KM) at 20 knots (23 MPH/37 KMH). Machinery consisted of four White-Foster boilers that provided steam to a pair of Westinghouse geared turbines. A total of 27,000 HP to the twin screws provided a speed exceeding 35 knots (40 MPH/65 KMH).

Armament for the CLEMSONs was the same as for the earlier WICKES Class. They carried four 4-inch (102MM)/50 caliber guns: one on the forecastle, two on the deck superstructure amidships, and one on the quarter deck. The quarterdeck 4-inch gun was later moved to the aft deck superstructure to make room for depth charge roller tracks. The 4-inch guns were effective against surface targets, but not against aerial targets because of elevation limits (-15° to +20°). The 3-inch (76MM)/50 caliber gun replaced the 4-inch guns in some instances, notably on converted ocean escorts. A pair of 3-inch/23 caliber guns were initially fitted for anti-aircraft protection. Additionally, two .50 caliber (12.7MM) water-cooled machine guns were usually fitted for anti-aircraft use. The ships' armament was increased when the US entered World War Two in December of 1941, with 20MM Oerlikon cannon and 40MM Bofors cannon replacing the 3-inch/23 guns.

HOVEY (DD-208) and LONG (DD-209) were fitted with twin 4-inch weapons fore and aft in addition to the two superstructure mounted guns. BROOKS (DD-232) had 5-inch (127MM)/51 caliber guns in place of the 4-inch weapons.

During the First World War, the Germans demonstrated the value of the submarine (U-boat) in its ability to sink a great amount of ships, basically undetected. In an attempt to counter these attacks, Allied ships were sent in convoys, with escorts consisting of destroyers and torpedo boats. The war ended with no means of locating and attacking the U-boats. Between the wars, the British and Americans began to develop a means of locating submerged submarines with sound waves. The British asdic[1] device – called sonar[2] by the US – plus the High-Frequency/Direction-Finding (HF/DF) radio receiver proved to be the edge that the Allies needed during World War Two to counter the U-boat menace.

Once the enemy submarine was located, depth charges and hedgehog mortars were employed to finish off the sub. The depth charges used were the Mk 6 'ash can' and the Mk 9 fast sinking types. They were either rolled off the stern from roller tracks or shot off the deck with 'K' or 'Y' guns. The depth charges exploded at a set depth, up to 800 feet (244 M) deep. The hedgehog system consisted of spigot mortars housed in a box on the forecastle. The mortar round exploded against the hull of the submarine.

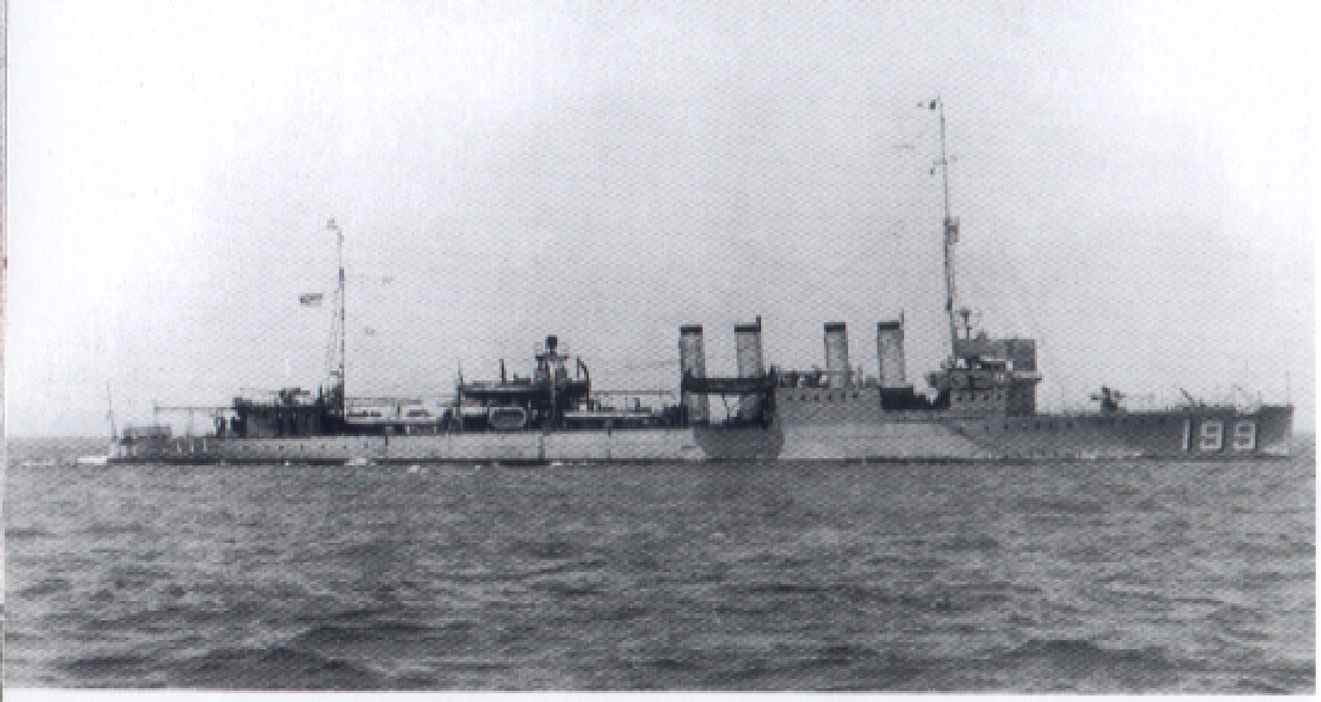
Twelve 21-inch (533MM) torpedo tubes were fitted in four triple mounts on the amidships deck between the superstructures. There were no provisions for additional torpedoes, so if all were expended the ship would have to seek out a Destroyer Tender (AD) to replenish the supply.

[1]Asdic: Anti-Submarine Detection Investigation Committee.

[2]Sonar: Sound Navigation and Ranging.

CLEMSON (DD-186) led the second class of 'liberty destroyers' built during World War One. This Class was designed with increased endurance for extended operations with the fleet. CLEMSON was built by Newport News Shipbuilding in Newport News, Virginia and commissioned on 29 December 1919. She served in the training role during World War Two and was stricken soon after the conflict ended. (Elsilrac)

DAHLGREN (DD-187) was reconfigured to an ocean escort with the removal of two boilers and two of the 4-inch (102MM) guns and the addition of increased 20MM cannon armament and depth charge equipment. An SA air-search radar sits atop the foremast and an SG sea-search radar antenna is located on a foremast platform. DAHLGREN is camouflaged in Measure 22, the Graded System. (Floating Drydock)



DALLAS (DD-199) cruises on the high seas in the 1930s. She was modified with the 3-inch gun located on the aft deck and the 4-inch gun moved to the after deckhouse. DALLAS is camouflaged in Measure 3 the Light Gray System. She participated in the invasion of North Africa in November of 1942 by smashing the obstructions at the mouth of the Sebu River and landing her embarked assault troops. (Real War Photos)

BROOME (DD-210) moves at speed in the Atlantic in 1943. She was modified by the removal of her four 4-inch guns and the addition of five 3-inch (76mm) guns. Her Number Three and Four triple torpedo tubes were 'beached.' All of the guns are fitted with splinter shields and ready round service lockers are placed close to these weapons. BROOME is camouflaged in Measure 22. (Real War Photos)

DALLAS (DD-199) undergoes some modifications to her bridge area in 1943. Her foremast is fitted with SC air-search radar and she is camouflaged in Measure 22, a scheme of Haze Gray over Navy Blue. All of the 4-inch gun mounts are fitted with steel splinter shields. Newport News Shipbuilding built DALLAS and launched her on 31 May 1919. (Floating Drydock)

In a 1923 experiment, USS CHARLES ASHBURN (DD-214) was fitted to carry a small Curtiss TS-1 floatplane on the forecastle. This aircraft blocked the forward view from the bridge and the TS-1 was soon removed. NOA (DD-343) was modified to carry a Curtiss XSOC-1 Seagull floatplane in 1940. This time, the seaplane was mounted in a cradle on the quarterdeck forward of the aft superstructure. A crane was fitted in place of the main mast to facilitate placing the aircraft in the water. No aircraft catapult was fitted, making a water take-off necessary. This experiment proved successful enough that a decision was made during World War Two to fit a catapult on several FLETCHER Class destroyers.

Losses of 'flush deck' destroyers during World War Two began when the German submarine U-562 torpedoed USS REUBEN JAMES (DD-245) 600 miles (966 km) west of Ireland on 31 October 1941. This was just over one month before the US had officially entered the conflict.[3] The next loss occurred on 18 February 1942, when TRUXTUN (DD-229) ran aground off the coast of Newfoundland, Canada. PEARY (DD-226) was sunk in Darwin Harbor, Australia on 19 February 1942, following an attack by Japanese aircraft from New Guinea. EDSALL (DD-219) was sunk with the loss of all hands by the Japanese battleship HIEI south of Java on 1 March 1942. The same day, POPE (DD-225) was also lost in the Java Sea after having been attacked by Japanese cruisers. PILLSBURY (DD-227) was sunk with the loss of all hands off the Dutch East Indies (now Indonesia) between 1 and 4 March 1942. STEWART (DD-224) was abandoned in Java by US naval forces after setting off destructive charges. The Japanese soon occupied Java and discovered her still in drydock. After extensive repairs, STEWART was used by the Japanese as an escort designated P 102 until the war's end in August of 1945. US forces discovered STEWART in Japan and she was returned to the US and eventually used as a target. STURTEVANT (DD-240) was lost on 26 April 1942, when she sailed into a minefield off Florida. The final loss of a US 'flush deck' destroyer occurred in the Atlantic Ocean on 2 November 1943, when BORIE (DD-215) engaged the German sub-

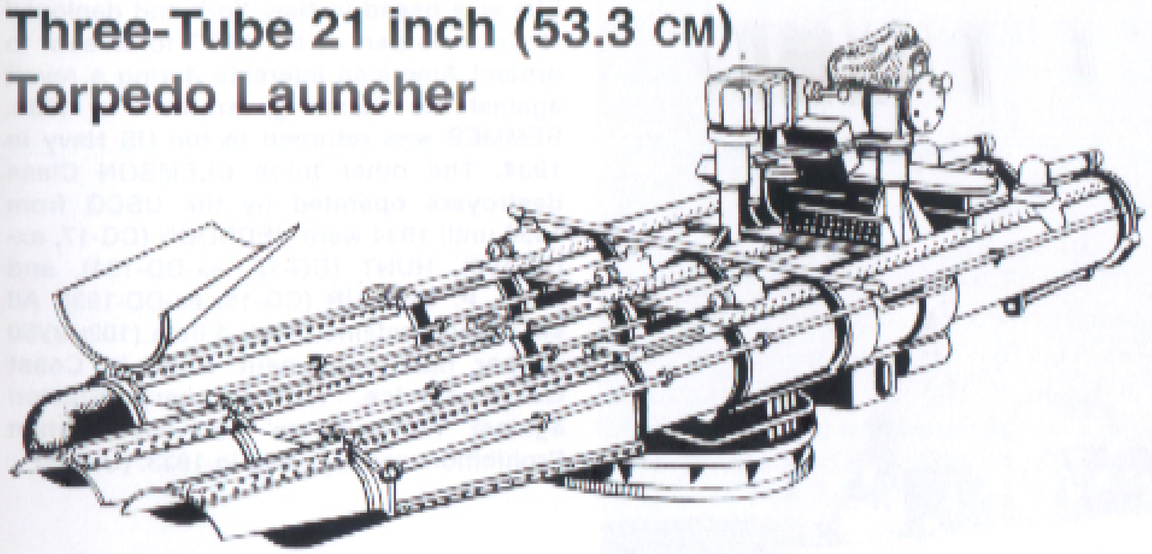
[3]From mid-September of 1941, the US Navy began escorting convoys in the western sector of the North Atlantic.

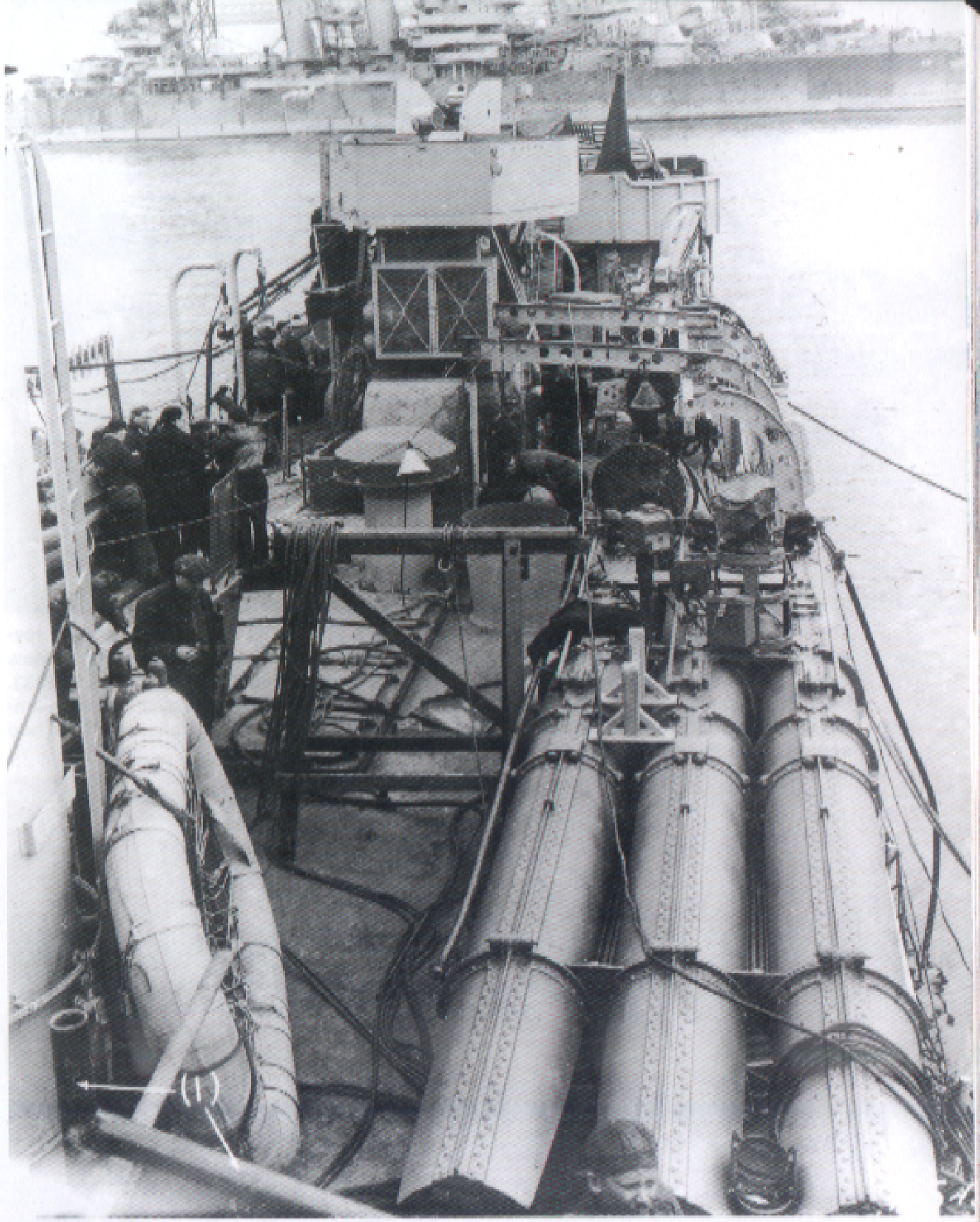
The torpedo officer has marked the Number One and Two torpedo tubes on top for quick identification aboard BORIE (DD-215) in July of 1942. Each launcher had three 21-inch (533MM) tubes. One of the ship's boats is lowered to the water on the starboard side for ferrying crew around the harbor. A second boat was removed from her port davits, parallel with the dock. BORIE sank the German submarine U-405 by ramming on 2 November 1943, but was severely damaged in the attack and sunk by US forces to prevent its capture. (Floating Drydock)

marine U-405. The attack was pressed and BORIE rammed and overran the U-boat. The submarine became entangled, but finally sank after a furious battle between the two enemies. BORIE was seriously damaged and eventually sank the same day.

Four of the 'flush deckers' were converted into fast banana boats following World War Two. PUTNAM (DD-287) became the TEAPA; WORDEN (DD-352) the TABASCO; DALE (DD-290) the MASAY; and OSBORNE (DD-295) became the MATAGALPA. By 1946, all of the 'flush deck' destroyers – some which had served in two great wars – were put up for sale or scrapped.

Three-Tube 21 inch (53.3 CM) Torpedo Launcher

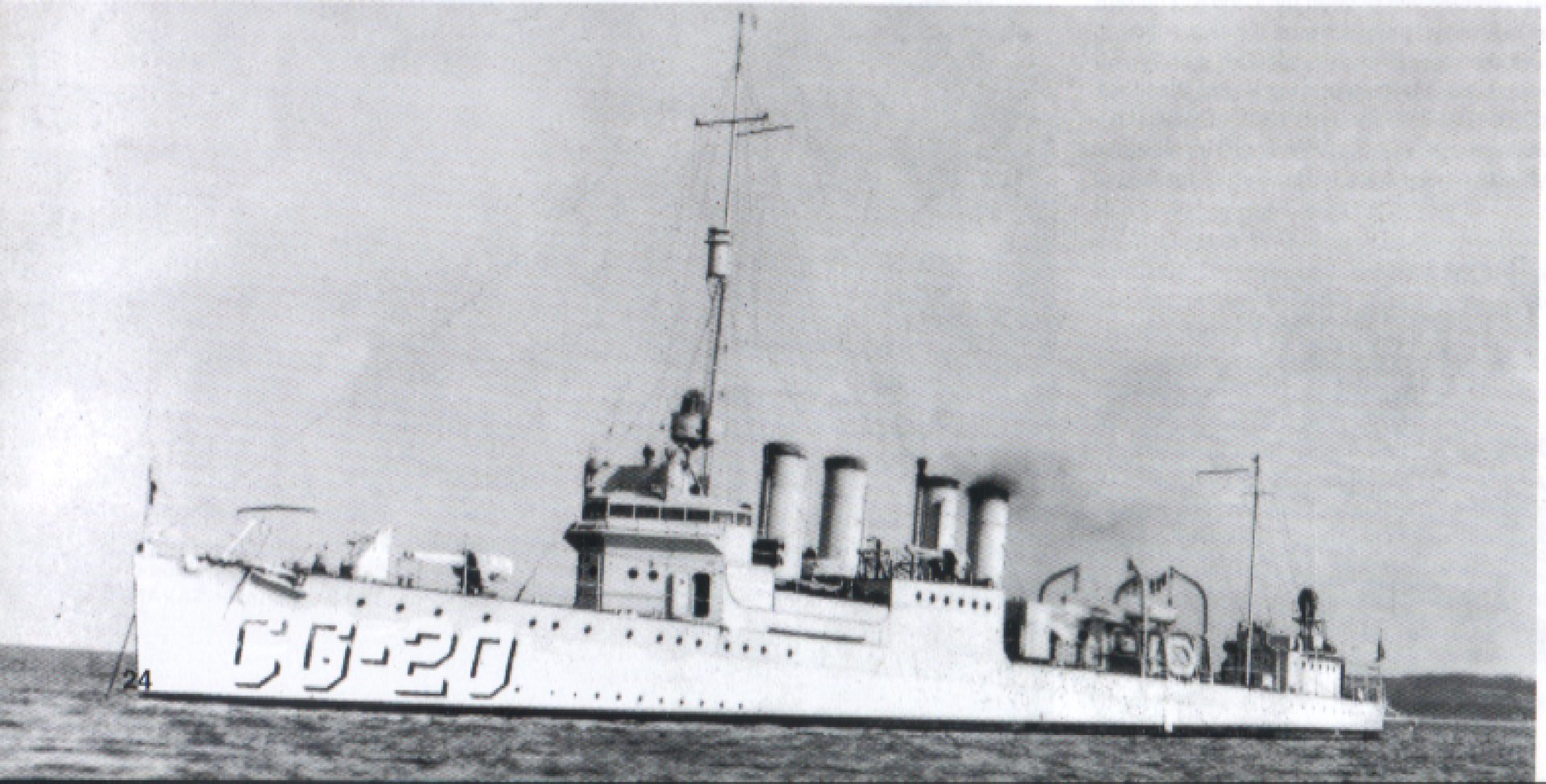




The Number Two triple torpedo tube launcher faces forward on OVERTON (DD-239) while she undergoes refit at the New York Navy Yard on 10 April 1943. This launcher was mounted along the port railing. OVERTON's aft deckhouse was reconfigured with the addition of 20MM cannon and the addition of a 4-inch gun on the port side. The light cruiser SAVANNAH (CL-42) is astern of OVERTON.

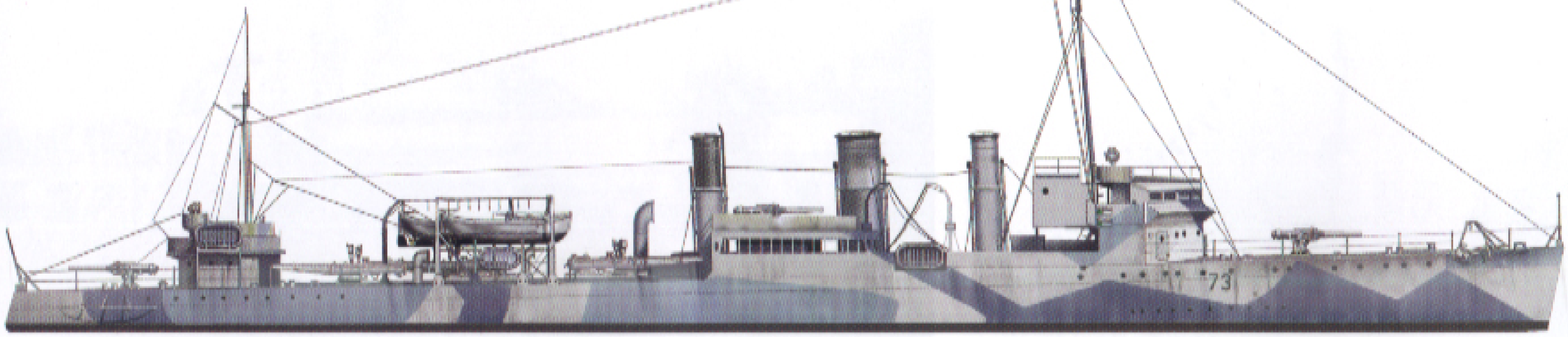
The United States Coast Guard (USCG) acquired six CLEMSON Class destroyers for revenue duties in 1930. GEORGE E. BADGER (CG-16, ex-DD-196) was stationed at New London, Connecticut, but participated in the force sent to Cuba during a revolt in 1933. BADGER was returned to the US Navy in 1934 and converted to a destroyer seaplane tender (AVD) in 1938. In 1943, she was converted to a high-speed attack transport (APD) and served in the Pacific. (USCG)

WELBORN C. WOOD (CG-19, ex-DD-317) was acquired by the USCG in 1930 and stationed at New London. She was also part of the USCG force sent to Cuba to protect American interests during the 1933 revolt. Following her Coast Guard service, WOOD was broken up to comply with the 1930 London Naval Treaty. She is painted in Measure 3, the Light Gray (approx. FS36320) Scheme. (USCG)

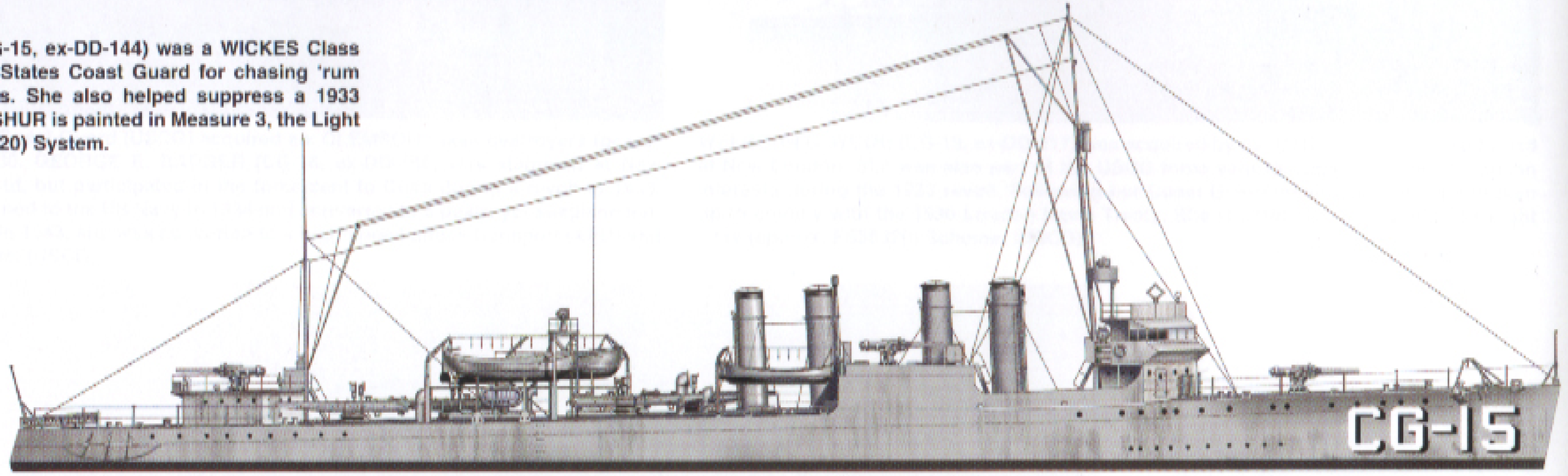


SEMMES (CG-20, ex-DD-189) was commissioned as an USCG cutter on 25 April 1932. She was based in New York and deployed to Cuba as part of an USCG force sent to protect American interests during a revolt against the Cuban government in 1933. SEMMES was returned to the US Navy in 1934. The other three CLEMSON Class destroyers operated by the USCG from 1930 until 1934 were HERNDON (CG-17, ex-DD-198), HUNT (CG-18, ex-DD-194), and ABEL P. UPSHUR (CG-15, ex-DD-193). All six vessels retained their 4-inch (102mm)/50 caliber main armament while in Coast Guard service. Their primary mission against 'rum runners' was ended when Prohibition was repealed in 1933. (USCG)

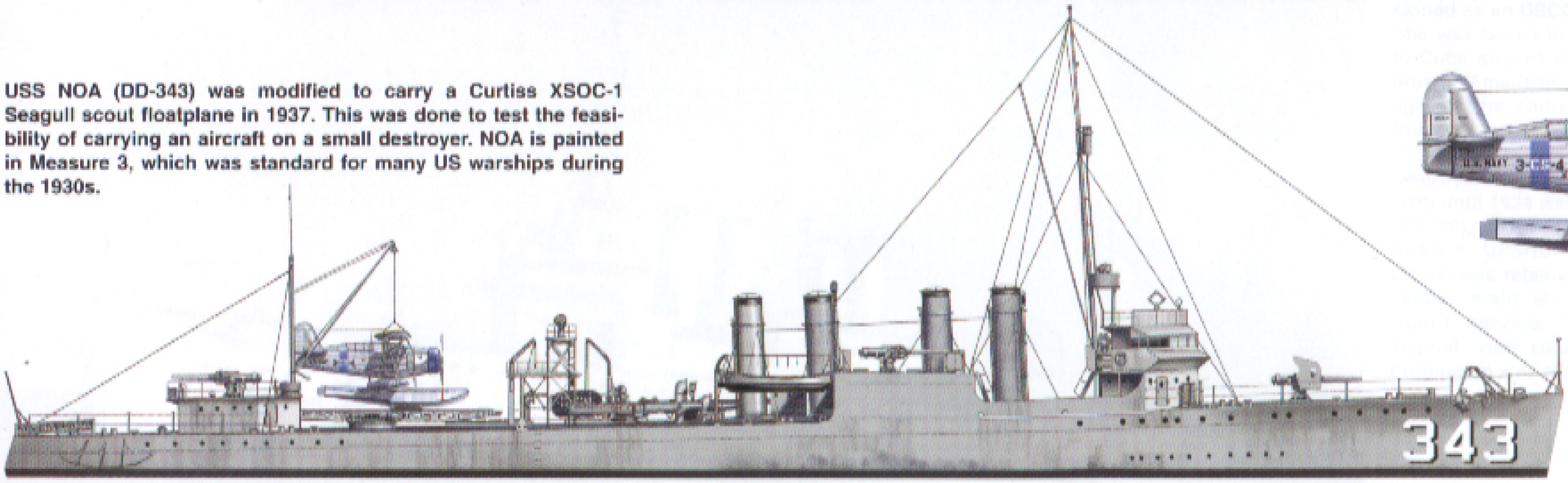
used to escort convoys from America to Great Britain during the First World War. She is painted in a 'splinter' camouflage pattern employed during that conflict.



USS ABEL P. UPSHUR (CG-15, ex-DD-144) was a WICKES Class ship loaned to the United States Coast Guard for chasing 'rum runners' in the early 1930s. She also helped suppress a 1933 revolt in Cuba. ABEL P. UPSHUR is painted in Measure 3, the Light Gray (approximately FS36320) System.

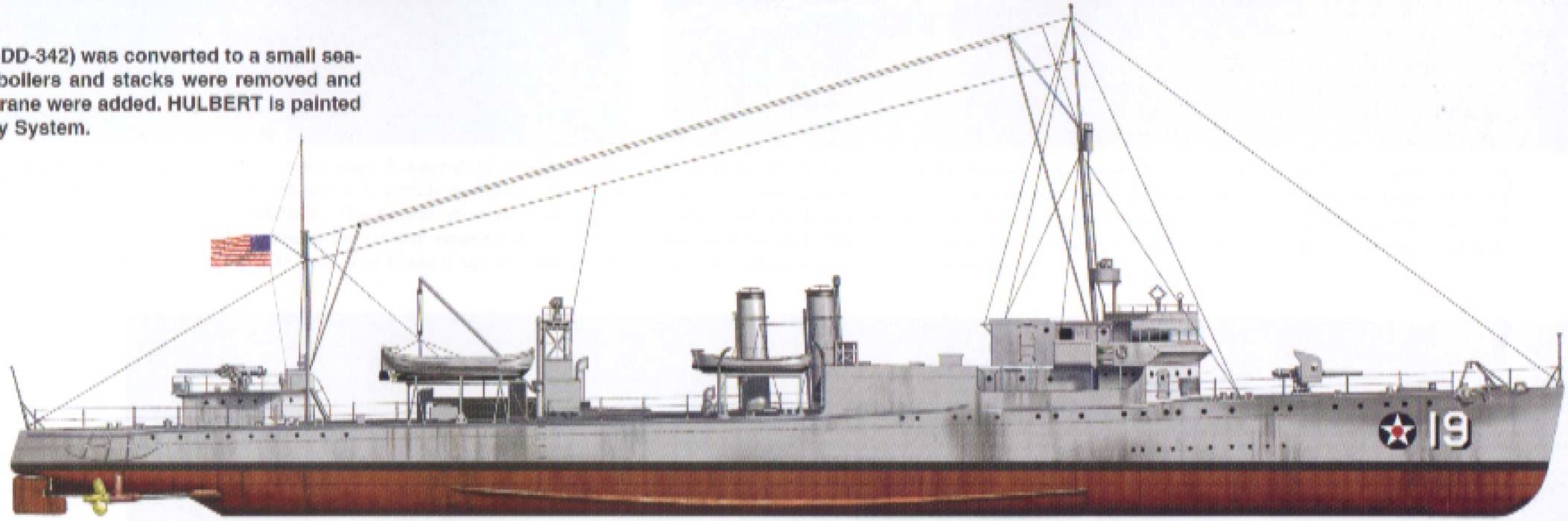


USS NOA (DD-343) was modified to carry a Curtiss XSOC-1 Seagull scout floatplane in 1937. This was done to test the feasibility of carrying an aircraft on a small destroyer. NOA is painted in Measure 3, which was standard for many US warships during the 1930s.

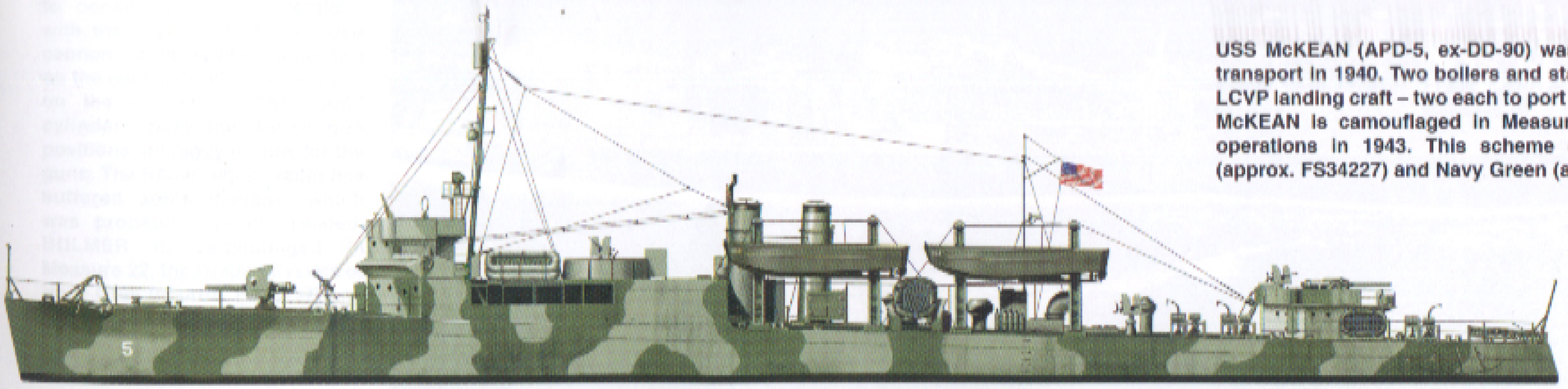


Japanese forces captured USS STEWART (DD-224) in Java in 1942. They reconfigured her for use as a patrol boat and assigned it the designation P 102. The US recaptured STEWART at war's end and sailed her, with a volunteer crew, back to San Francisco. She is painted in Imperial Japanese Navy Haze Matte 32 dark gray.

USS HULBERT (AVP-19, ex-DD-342) was converted to a small seaplane tender in 1939. Two boilers and stacks were removed and four boats and a handling crane were added. HULBERT is painted in Measure 3, the Light Gray System.



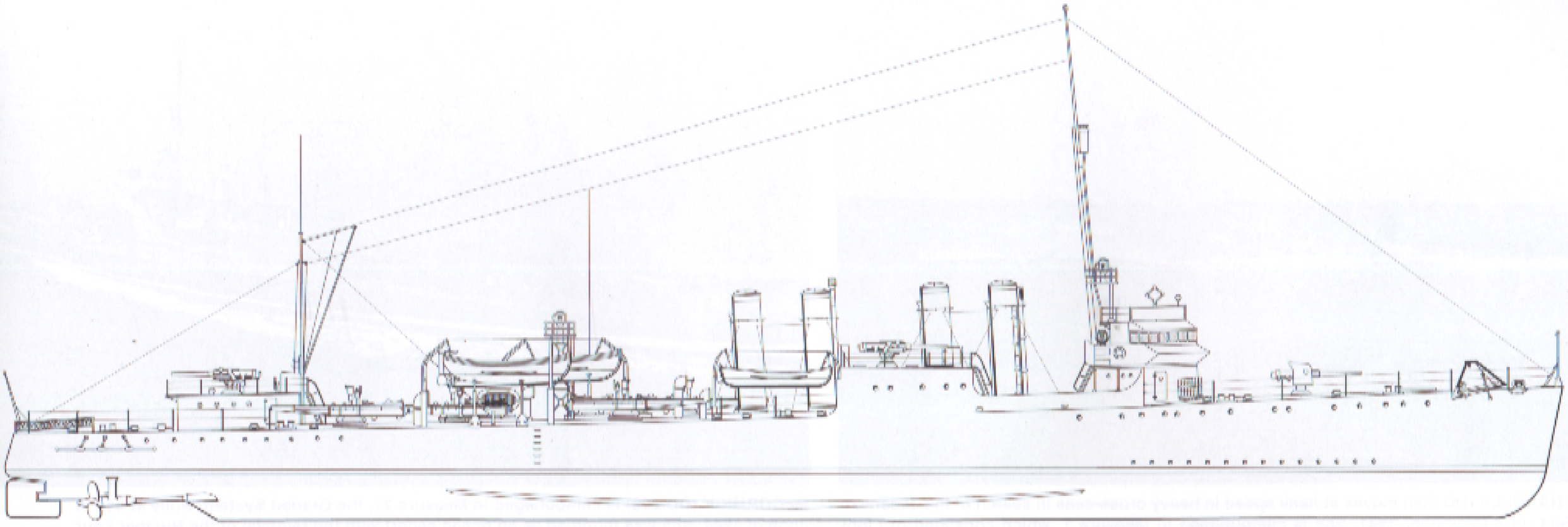
USS McKEAN (APD-5, ex-DD-90) was converted to a fast attack transport in 1940. Two boilers and stacks were removed and four LCVP landing craft – two each to port and starboard – were added. McKEAN is camouflaged in Measure 31-15T for Pacific Island operations in 1943. This scheme consisted of Ocean Green (approx. FS34227) and Navy Green (approx. FS34128).

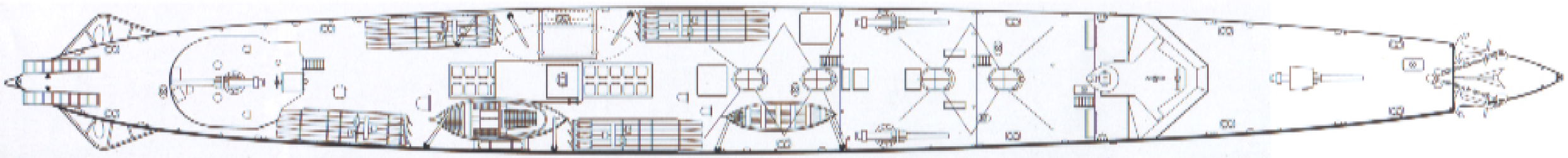


CHANDLER (DD-206) moves at flank speed in heavy cross-seas in search of the Japanese fleet on 7 December 1941. She is camouflaged in Measure 1, which consisted of Light Gray (approx. FS36320) and Dark Gray (approx. FS36163). The search proved fruitless as the Japanese had escaped northward and had a head start on the searching US Fleet. CHANDLER served in the Pacific throughout the war and was broken up in 1946. (Real War Photos)

McCORMICK (DD-223) is camouflaged in Measure 22, the Graded System, while at sea in June of 1944. She was modified as an ocean escort with the removal of the Number Four boiler and stack and the Number 3 and 4 torpedo tubes. Six 3-inch (76MM) guns replaced the four 4-inch (102MM) guns. One 20MM cannon each is mounted atop the bridge roof and the after deckhouse. (Real War Photos)

BULMER (DD-222) was modified to ocean escort specifications with the addition of seven 20MM cannon: three on the bridge, two on the center deckhouse, and two on the bandstand. The round cylinders near the 4-inch gun positions are ready rounds for the guns. The SA air-search radar has suffered some damage, which was probably typhoon related. BULMER is camouflaged in Measure 22, the Graded System of Haze Gray (approx. FS35237) and Navy Blue (approx. FS35044).





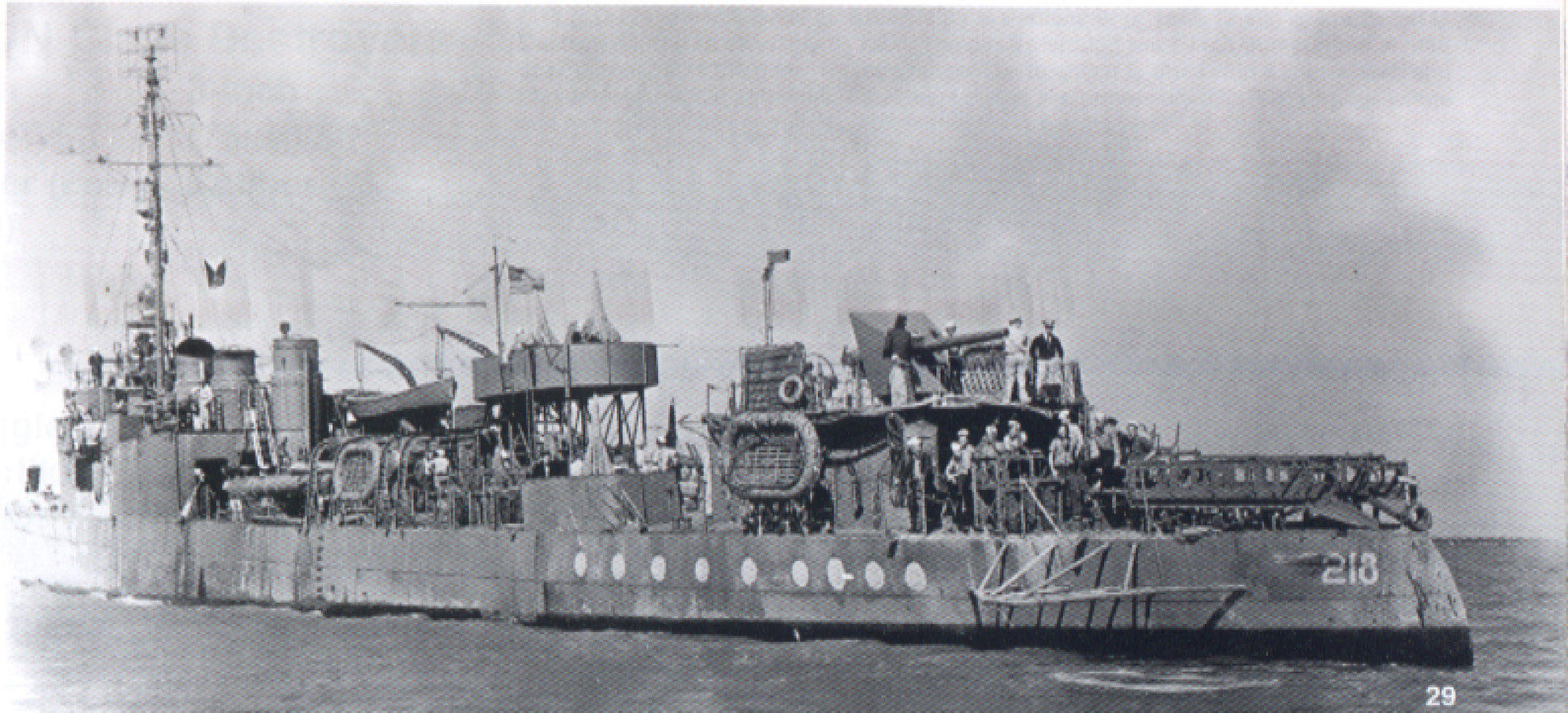
USS PAUL JONES (DD-230) Specifications

Length:.....314 feet (95.7 M)
Beam:.....30 feet 10 inches (9.4 M)
Draft:.....9 feet 10 inches (3 M)
Displacement:.1090 Tons (989 MT) Standard, 1310 Tons (1188 MT) Full Load.
Propulsion:.....27,000 SHP/Two Screws
Speed:.....35 Knots (40 MPH/65 KMH)
Compliment:.114 Officers and Men
Armament:....Four 4-Inch (102MM)/50 caliber guns in single mounts; one 3-Inch (76MM)/23 caliber gun; 12 21-Inch (533MM) torpedo tubes In four three-tube launchers; and two depth charge roller tracks.

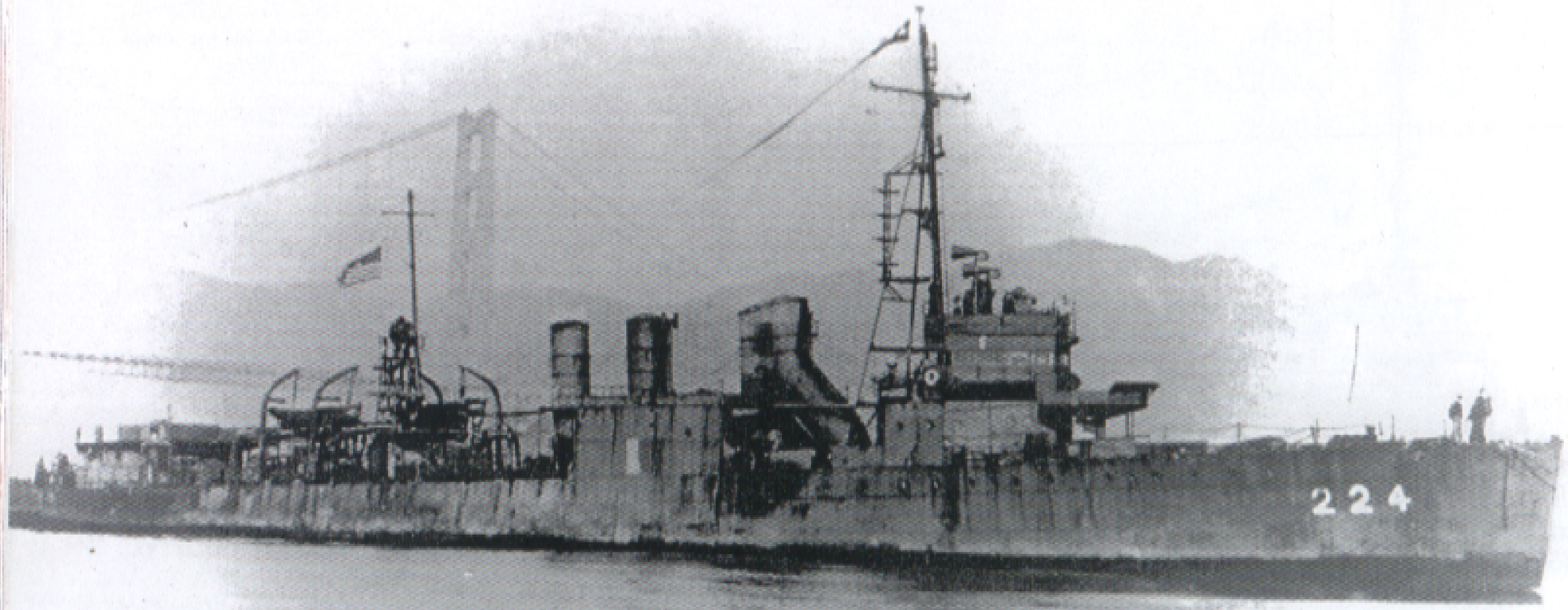
BORIE (DD-215) is dockside between North Atlantic escort missions in 1942. She escorted convoys from the United States and Canada to Great Britain. BORIE is painted in a modified Measure 12, with splotches, whose colors included Ocean Gray (approx. FS35164), Sea Blue (approx. FS35045), and Haze Gray. She was constructed by William Cramp and Sons Shipbuilding and launched on 4 October 1919. (Floating Drydock)

BORIE (DD-215) burns and settles by the stern after ramming the German submarine U-405 in the North Atlantic on 1 November 1943. U-405 sank that day, but BORIE remained afloat until the next day, when US naval forces decided to sink the mortally wounded ship. Before a torpedo could be loosed from BARRY (DD-248), BORIE sank off the Azores. She was camouflaged in Measure 22 at the time of her loss. (Real War Photos)

PARROTT (DD-218) leaves Mare Island Shipyard in San Francisco in 1942, following an extensive refit. This refit included removing her Number 3 and 4 torpedo tubes and adding 20MM cannon and depth charge roller tracks in their place. The modifications also included the removal of the Number 4 boiler and stack and the addition of a bandstand for a pair of 20MM cannon. The number Four 4-inch gun has a shield that was usually only found on the Number One bow mount. All of the hull portholes were plated over and painted. The metal framing at the stern is a propeller guard, which was fitted to both port and starboard sides above the ship's screws. PARROTT is camouflaged in Measure 21, the Navy Blue System.



STEWART (DD-224) is camouflaged in Measure 3, the Light Gray System, while cruising at sea in the 1930s. All her 4-inch guns were in open mounts, which were unpleasant to man in foul weather. The bandstand between the torpedo tubes supported the two installed searchlights. STEWART served in the Pacific early in World War Two when she was severely damaged during a sea battle in the Badoeng Strait on the evening of 19-20 February 1942. She returned to Surabaya, Dutch East Indies for repairs on 22 February, but was further damaged by Japanese bombs while in dry dock. The decision was made to destroy the ship since the Japanese were advancing toward Surabaya. Explosive charges were set off on 2 March 1942 and the Americans presumed that STEWART was destroyed. (Elsilrac)



The R.A.M.P. (Recovered Allied Military Personnel) 224, ex-USS STEWART (DD-224), flies her coming home pennant at the foremast while she enters San Francisco Harbor in March of 1946. The Japanese had raised and reconstructed STEWART in 1943 and named her *Skokai-Tei* (Patrol Boat) 102. They trunked the Number 1 and 2 stacks and added a tripod foremast. The Imperial Japanese Navy then used her in the Pacific War against the Americans. STEWART was discovered in Kure Harbor, Japan following the war's end in 1945 and she was returned to the United States. One day after she was decommissioned on 23 May 1946, STEWART was towed into the Pacific and used by the US Navy for aerial bombing practice. (Elsilrac)

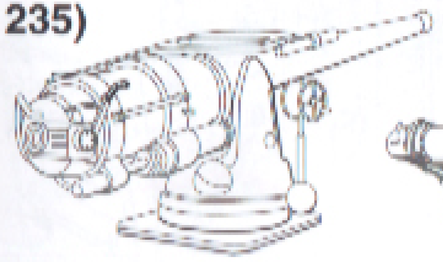
MacLEISH (DD-220) demonstrates her recent modification to ocean escort. She is camouflaged in Measure 12, with splotches. All main gun positions are fitted with splinter shields. The .50 caliber (12.7mm) machine guns added to the center deckhouse were later replaced by 20mm Oerlikon cannon when they become available. Although an SC air-search radar antenna was mounted atop the foremast, the crow's nest lookout position is still on this mast. (Floating Drydock)

TRUXTUN (DD-229) shows off her newly installed stockless anchor, which lacked the stock (crossbar) of the older anchor she used and was easier to stow aboard the ship. The Number One 4-inch mount's curved shield gave a measure of protection to the gun crew. TRUXTUN was lost off of Chamber's Cove, Newfoundland after running aground during a fierce Atlantic storm on 18 February 1942. Only three officers and 43 sailors survived the disaster. (Floating Drydock)

FOX (DD-234) steams while on escort duty in September of 1943. She is camouflaged in Measure 14, the Ocean Gray System. The circles around the 4-inch gun mounts alerted deck personnel to the guns' rotating range. The foremast is fitted with SA air-search and SL sea-search radar antennas. Two 20mm cannon each were added to FOX's bridge wings and to the modified searchlight bandstand. (Real War Photos)

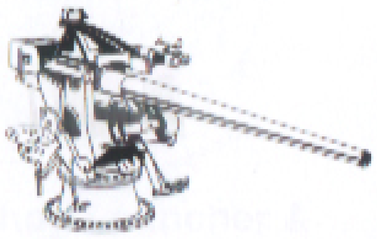
Guns of the CLEMSON Class Destroyers

5-Inch (127mm)/51 Caliber (DD-231 to 235)



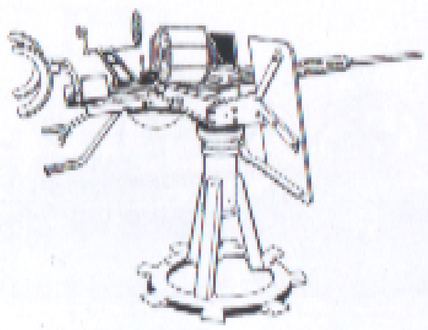
4-Inch (102mm)/50 Caliber (Bow Mount)

3-Inch (76mm)/50 Caliber



Single 40mm Bofors Cannon

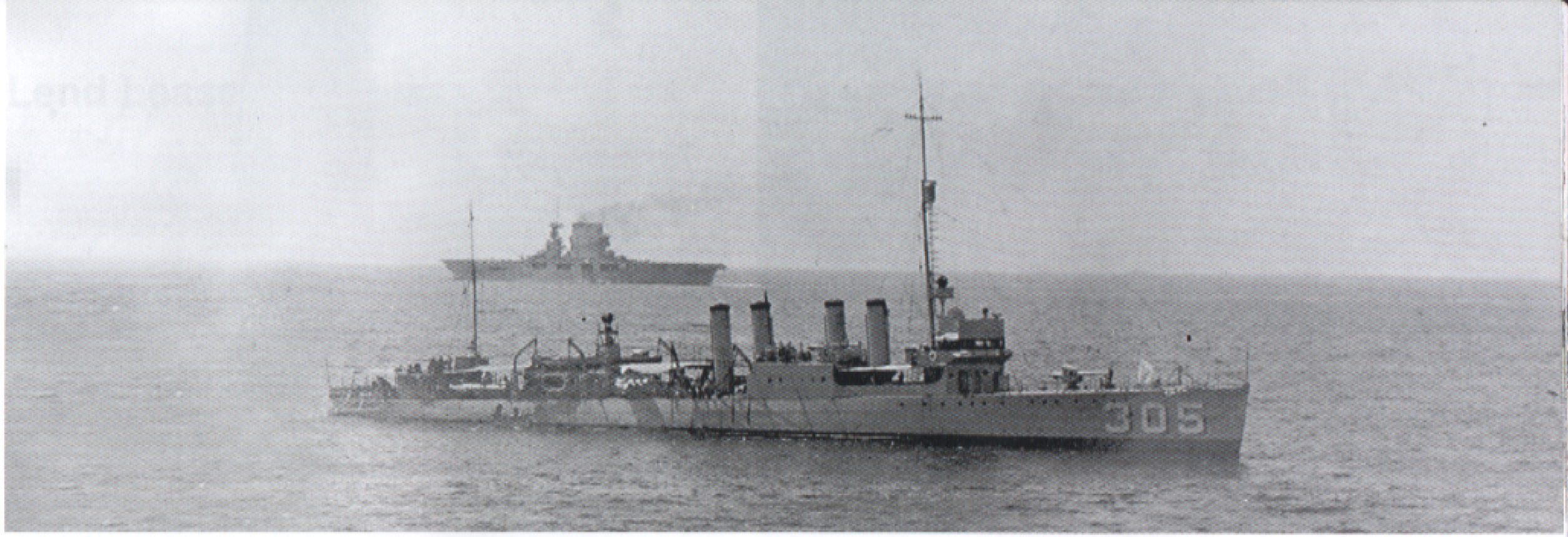
Single 20mm Oerlikon Cannon



Ensign Thomas E. Jamison, US Naval Reserve (USNR) is returned by BAINBRIDGE (DD-246) on the high line to the escort carrier SANTEE (CVE-29) on 28 July 1943. BAINBRIDGE was serving as carrier plane guard when Ens Jamison crashed into the Pacific. He was not the first or the last to reap the benefits of the plane guard destroyers. BAINBRIDGE was taking on 'C' bunker fuel as the personnel transfer took place. (Real War Photos)

LAUB (DD-263) moves rather slowly in peaceful 1940 waters. She is camouflaged in Measure 3, Light Gray (approx. FS36320) with Deck Blue (approx. FS35042) paint on the deck. Stack tops and the waterline boot topping is black. All of the 4-inch mounts are covered in canvas to protect them and their telescopic sights from the weather. A round life ring is placed on either side of the bridge wings per regulation. (Real War Photos)

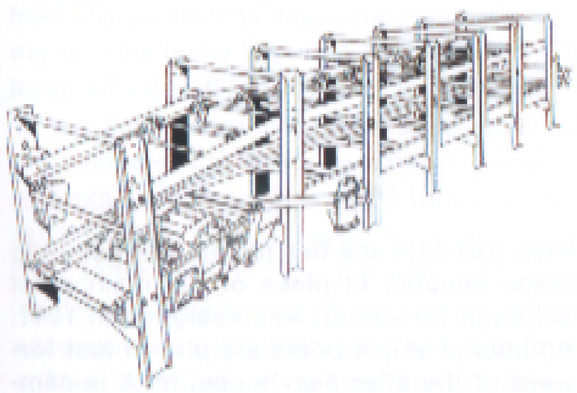
TURNER (DD-259) rides at anchor while two of her crew touch up her bow numbers. She is camouflaged in Measure 1, the Dark Gray System. TURNER's designation was changed from DD-259 to IX-98 – for auxiliary ship – in 1939. She was eventually designated as water-barge YW-56, named MOOSEHEAD, and used to transport and store water for the fleet. (Real War Photos)



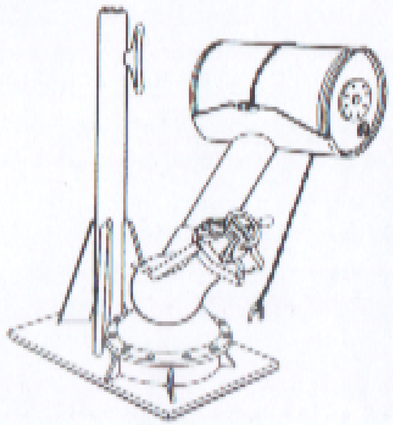
THOMPSON (DD-305) sails past the brand-new aircraft carrier SARATOGA (CV-3) on 12 April 1927. The Number Four 4-inch gun was relocated from the after deck to the deckhouse to make room for depth charge roller tracks. THOMPSON was one of 104 flush deckers that were scrapped between 1930 and 1939 to comply with various Washington Naval Treaties. (Real War Photos)

Anti-Submarine Warfare (ASW) Weapons

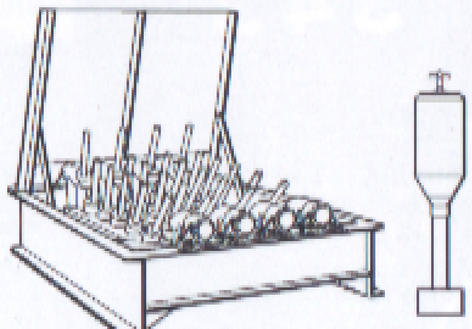
Depth Charge Roller Track



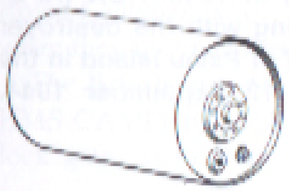
'K' Gun



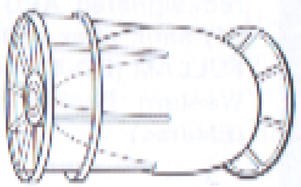
Hedgehog Launcher & Round



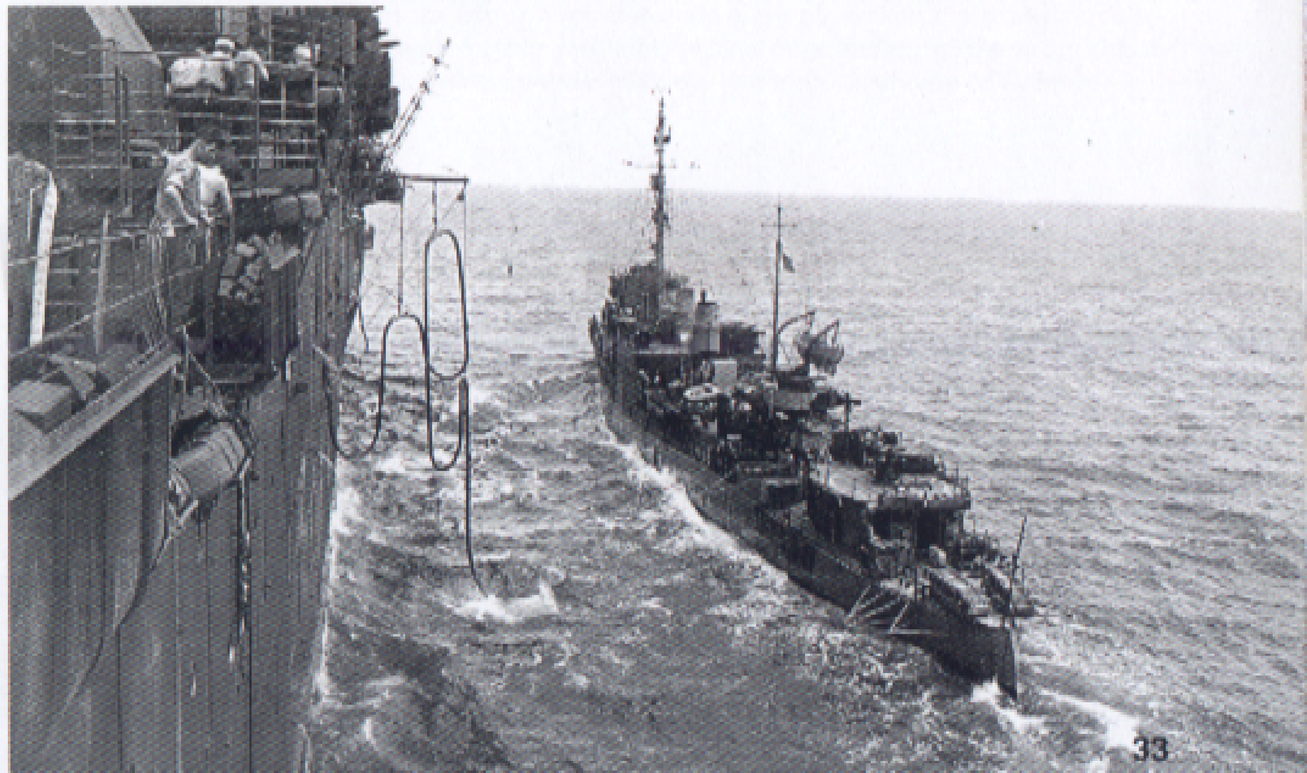
Mk. 6 Depth Charge



Mk. 9 Depth Charge



PAUL JONES (AG-112, ex-DD-230) comes along side an ESSEX Class carrier in the Pacific to take on fuel and provisions in June of 1945. Crewmen man the after steering station during the transfer to keep parallel position to the carrier. The after deckhouse included the aft steering station and the enlisted head. It also supported the Number Four 4-inch gun. PAUL JONES' after deck is covered with depth charge roller tracks and 'K' gun depth charge throwers. (Real War Photos)



LITCHFIELD (DD-336) is berthed in dry-dock alongside RENO (DD-303) in 1940. The after quarter deck deckhouse contained an enlisted washhouse, while the aft steering position is located atop the deck. Large propeller guards prevented objects from hitting the nine foot two inch (2.8 M) diameter, three-bladed propellers. LICHFIELD is camouflaged in Measure 3, Light Gray, while RENO is painted in Measure 1, Dark Gray. (Elsilrac)

NOA (DD-343) was modified to carry a Curtiss XSOC-1 Seagull from Cruiser Scouting Squadron Three (VCS-3) in June of 1937. The modifications included the removal of the main mast and placing an aircraft handling crane in its place and the 'beaching' of the Number 3 and 4 triple torpedo tubes. The XSOC-1 was placed on an aircraft-handling dolly while on deck. No aircraft catapult was fitted due to space constraints. NOA is camouflaged in Measure 3, Light Gray. (Floating Drydock)

NOA (DD-343) still has the aircraft-handling crane situated in place of the main mast although no aircraft was assigned in 1941. Additional ship's boats are placed just forward of the after deckhouse. NOA is camouflaged in Measure 14, the Ocean Gray (approx. FS35164) System. She was converted to a high-speed attack transport and redesignated APD-24 in 1943. NOA (APD-24) sank after colliding with the destroyer FULLAM (DD-474) off of Palau Island in the Western Pacific on 12 September 1944. (Elsilrac)

Lend Lease to Britain

When Germany attacked Poland on 1 September 1939, Great Britain was drawn in by treaty and declared war on Germany two days later. By June of 1940, the fall of France and the Low Countries left Britain alone and fighting for her very existence. Her only lifeline was 3000 miles (4828 KM) across the Atlantic Ocean to the United States and Canada.

The convoy route between the two great allies had to be protected and Great Britain lacked the ships to do the protecting. The United States offered to lend 50 'flush deck' destroyers to the British in exchange for leases on various naval and air bases around the world. In September of 1940, the deal was sealed and the US turned over the 50 'flush deck' destroyers to the British.

The Royal Navy renamed these 'flush deckers' the TOWN Class, with their new names honoring cities in the United States that were common to those in Canada and Great Britain. These ships were also modified in both armament and electronics. Early modifications consisted of installing British radio and anti-submarine equipment, including asdic (sonar) and depth charge throwers. The two amidships torpedo tubes were removed to make space for 20MM Oerlikon cannon. Additionally, a British 12-pounder (76MM) gun replaced the aft 4-inch gun. The British Type 273 'lantern' surface-search radar antenna was fitted to the bridge superstructure roof. Two boilers were removed to increase fuel oil storage and improve range. In their final ocean escort configuration, the British 'flush deckers' were armed with three 20MM cannon, one 3-inch gun, two .50 caliber (12.7MM) machine guns, depth charge roller tracks and throwers, plus a single 21-inch triple torpedo tube mounted on the deck centerline. Further modifications were made to the bridge area with the addition of another deck to make room for more electronic equipment.

Various electronic means were employed to aid in submarine hunting. Asdic was an underwater sounding device that used sound waves to locate submerged subs. Once located, the sub could be triangulated with, hopefully, another destroyer so equipped with asdic and a position could be determined. A High-Frequency/Direction-Finder (HF/DF), called 'Huff/Duff,' was basically an antenna that could pick up radio emissions from a U-boat that was communicating with its home base or another U-boat. The Germans never caught on that they could be located by the HF/DF and kept broadcasting in the clear.

Once the submarine was located, it had to be attacked and destroyed. There were many ways to accomplish this task; one was to roll depth charges over the stern utilizing the roller tracks, or depth charge throwers could launch a charge over 100 feet (30.5 M) from the ship, which extended the charge's range. Hedgehog spigot mortars would be used if the sub was fairly close to the surface. The ship's guns could be employed for surface targets. If all else failed, the destroyer could ram the submarine, although this tactic often proved fatal to both ships. In a few instances, the destroyer's bow was filled with concrete to reinforce the hull.

The 'flush deckers' in British service were camouflaged in Admiralty camouflage colors, mostly in the Western Approaches schemes that consisted of light grays, blues, and greens. Mountbatten Pink (approximately FS30206) was briefly tried, but found to be unacceptable.

The British further loaned some of the 'flush deckers' to the Royal New Zealand Navy, the Royal Canadian Navy, and the Soviet Navy. The Soviets utilized these destroyers until 1950, when they returned them to Britain for scrapping.

The British lost many 'flush deckers' in five years of service. The most notable loss was HMS CAMPBELTOWN (I.42; ex-USS BUCHANAN DD-131), which was used to ram the lock gates at St. Nazaire, France on 28 March 1942. CAMPBELTOWN was modified to

HMS BUXTON (H.96) – formerly USS EDWARDS (DD-265) – was one of 50 flush deck destroyers the US transferred to Great Britain in September of 1940. The Royal Navy operated her in the Fifth Group of the TOWN Class until 1943, when she was transferred to the Royal Canadian Navy. BUXTON is camouflaged in the Simplified Scheme, Variation 6 of light blue over medium green. The British removed all torpedo tubes and extensively modified the bridge. A 'lantern' housing for the Type 273 surface-search radar antenna is atop the bridge and a Radio Direction Finder (RDF) is mounted on a framework extending out in front of the bridge. (National Archives of Canada)

HMCS COLUMBIA (I.49; here painted I-49) is camouflaged in a three-tone Western Approaches Scheme while cruising off the coast of Nova Scotia in December of 1942. She is the former USS HARADEN (DD-183), which was transferred to Canada in 1940 and placed in the TOWN Class' Fourth Group. Splinter mats were placed on the bridge face to protect the crew. COLUMBIA was further modified with a degaussing girdle around her hull to protect against magnetic mines and torpedoes. (National Archives of Canada)

HMCS HAMILTON (I.24; here painted I-24), the former USS KALK (DD-170), rides at anchor at Deep Brook, Nova Scotia in November of 1944. She belonged to the Fourth Group of the TOWN Class and was modified to a long-range ocean escort with the removal of one boiler and stack and the addition of greater fuel capacity. The bridge was modified with an added deck and splinter mats on the bridge face. A Type 273 radar antenna housing has been added to the bridge top and a RDF antenna on an extension off the front of the bridge. (National Archives of Canada)

An ice-covered HMS LEAMINGTON (G.19) sits in a Nova Scotia harbor awaiting her transfer to the Soviet Union in 1944. The former USS TWIGGS (DD-127) was transferred to Britain in 1940 and placed in the TOWN Class Second Group. The British transferred LEAMINGTON to Canada in 1942. Two years later, she went to the Soviet Navy, which renamed her ZHGUCHI (fiery). This vessel served as a DERZKI Class second-class destroyer until 1950. LEAMINGTON is camouflaged in a Western Approaches Scheme. (National Archives of Canada)

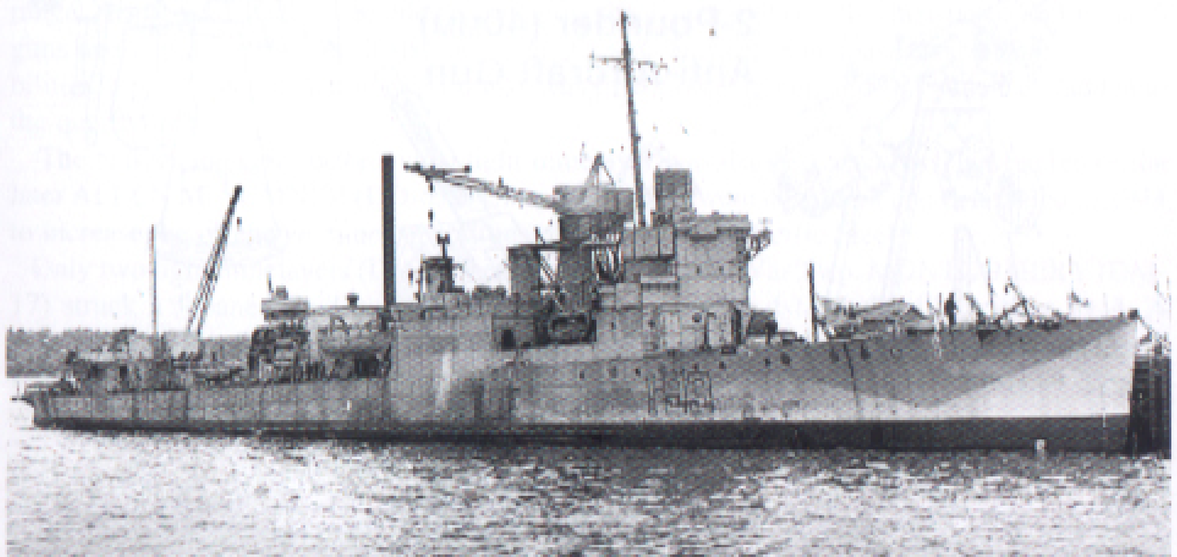
resemble a German MÖWE Class torpedo boat for this raid. The attack was important since it denied the Germans a drydock on the Atlantic coast large enough to handle a battleship or large cruiser.

The 50 lend-lease 'flush deckers' didn't win the Battle of the Atlantic against German U-boats by themselves, but during the dark days of 1940-1943 they were highly involved in the fight against the Germans.

HMCS ANNAPOLIS (I.04; here painted I-04) was the ex-USS MacKENZIE (DD-175), which was transferred directly to the Royal Canadian Navy in 1940 and placed in the Fourth Group of the TOWN Class. The 'lantern' housing for the Type 273 radar antenna is mounted atop the greatly modified bridge. She has been further modified with the removal of one boiler and stack and all torpedo tubes. A British 12-pounder (76MM) gun is placed atop the quarterdeck deckhouse replacing the American 4-inch (102MM) gun. Roman Numerals are added from the water line to the sheer of the deck, indicating that it was expected to see water at least up to the 25-foot (7.6 M) level of the stem. A 'yagi' type directional antenna has been added to the top of the foremast and a 'crow's nest' is just below the single yard. (National Archives of Canada)

HMCS NIAGARA (I.57; here painted I-57) was the former USS THATCHER (DD-162) that was loaned to Britain in 1940 and placed in the Fourth Group of the TOWN Class. NIAGARA is camouflaged in a variation of the Western Approaches Scheme, which consisted of light gray and pale blue. She has been modified with the removal of the Number 1 and 2 torpedo tubes and a British 12-pounder gun replaced the American 4-inch gun on the quarterdeck deckhouse. A 2-pounder (40MM) anti-aircraft gun is placed on the deck between the torpedo tubes. (National Archives of Canada)

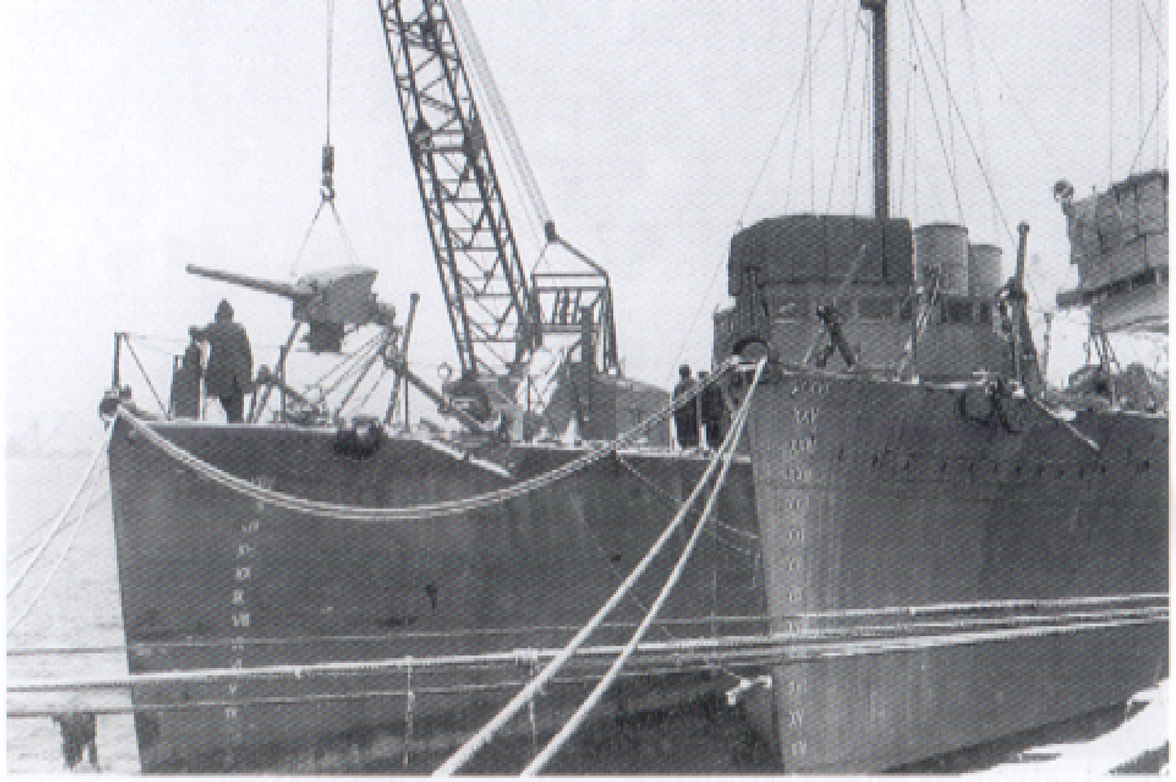
HMCS ST. FRANCIS (I.93; here painted I-93) was the USS BANCROFT (DD-256) that was presented to Britain and placed in the Fifth Group of the TOWN Class. Her Western Approaches camouflage scheme has taken considerable abuse from the North Atlantic. She was modified with the removal of one boiler and stack and the addition of a much modified bridge area. Further modifications include the fitting of the Type 273 radar, a 'hedgehog' Ahead Thrower Weapon (ATW), and six 20MM cannon. (National Archives of Canada)



HMS MANSFIELD (G.76) – formerly USS EVANS (DD-78) – was loaned to Britain and placed in the Third Group of the TOWN Class in 1940. She was then transferred to the Royal New Zealand Navy where she served until she was sent to the Royal Canadian Navy in 1942. MANSFIELD is berthed at Baltimore, Maryland for scrapping in 1944. All guns, torpedo tubes, and electronics have been removed and soon she will just be scrap metal for the continuing war effort. (National Archives of Canada)

HMS LINCOLN (G.42) cruises in the North Atlantic in May of 1942. The former USS YARNALL (DD-143) served in the Third Group of the TOWN Class until transferred to the Royal New Zealand Navy in 1942. In 1944 she was transferred to the Soviet Union as DRUZNI and served there until put up for scrapping in 1952. The British 12-pounder anti-aircraft cannon replaced the American 4-inch gun on the quarterdeck deckhouse. A single triple torpedo tube is placed on the ship's centerline. (National Archives of Canada)

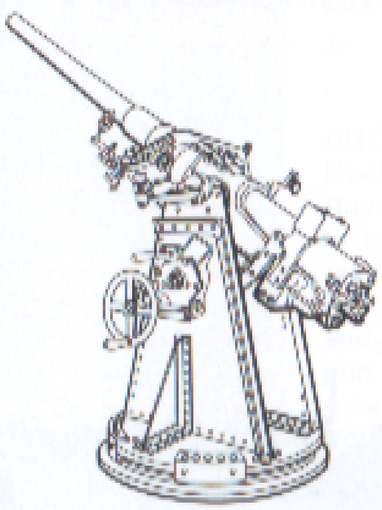
The bridge area of HMCS ST. FRANCIS (I.93) was modified with the addition of another steel deck atop the existing bridge and a Radio Direction Finder (RDF) antenna protruding from the bridge. The ship's crest is placed on the center of the bridge. The 'hedgehog' spigot mortar ATW and ready service locker are located just forward of the bridge area. ST. FRANCIS' Type 273 'lantern' radar antenna is mounted at the base of the foremast. (National Archives of Canada)



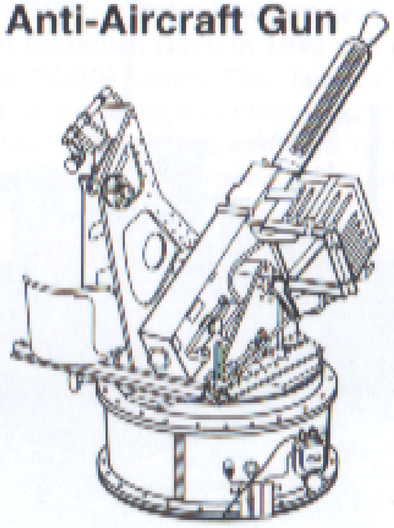
The Number One 4-inch (102mm) gun on HMCS ST. CROIX (I.65) is beached in favor of a faster firing 3-inch (76mm)/50 caliber anti-aircraft gun in March of 1941. ST. CROIX was the former USS McCOOK (DD-252) that served in the Fifth Group of the TOWN Class in the Royal Canadian Navy. She was undergoing a refit to make her a more valuable fighting ship. On 20 September 1943, the German submarine U-305 sank ST. CROIX off the south coast of Iceland. (National Archives of Canada)

British Weapons for Destroyers

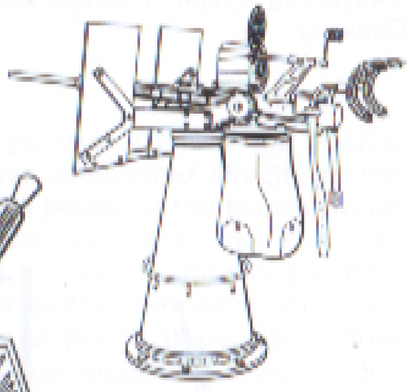
12-Pounder (76mm) Anti-Aircraft Gun



2-Pounder (40mm) Anti-Aircraft Gun



20mm Anti-Aircraft Gun



Light Minelayer (DM) Conversions

In 1930, the US Navy began converting four ex-WICKES Class 'flush deckers' to light mine layers. The United States had lagged behind the rest of the world's navies in mine warfare development and the conversion of these destroyers was an attempt to catch up. The British and Germans had modified some of their torpedo boats and destroyers as auxiliary mine layers by adding mine tracks and the US followed suit.

The conversions consisted of removing the four triple torpedo tubes and installing mine tracks (rails) along each side of the deck from the forward superstructure extending over the fantail. Further modifications consisted of placing the Number Four 4-inch gun on the aft superstructure. The armament of 4-inch guns remained the same, thereby not reducing their fighting abilities.

The first four conversions were from the WICKES Class and were completed in 1930 and 1931. These converted vessels were the class leader GAMBLE (DM-15, ex-DD-123), RAMSAY (DM-16, ex-DD-124), MONTGOMERY (DM-17, ex-DD-121) and BREESE (DM-18, ex-DD-122). Once completed, they were stationed in Pearl Harbor, Hawaii. The ships wore their original hull numbers until 1938.

The second four light minelayers were converted from the CLEMSON Class in 1937. This class consisted of TRACY (DM-19, ex-DD-214), the class leader PREBLE (DM-20, ex-DD-345), SICARD (DM-21, ex-DD-346), and PRUITT (DM-22, ex-DD-347). They were assigned to Mine Division One at Pearl Harbor.

The light minelayers were capable of carrying 80 Mk 6 tethered (moored) type mines. The Mk 6 mine consisted of the launching cradle, anchor, plummet, antenna float, and the positive-buoyancy case for the 300 pounds (136 KG) of TNT. This mine cost $400 in 1917 – quite a small investment for such a powerful weapon. Moored mines were effective against surface ships and submarines. The Mk 6 mine could be used as an offensive or defensive weapon. As an offensive weapon they could be planted in the enemies waters, harbors and known operating channels. For defensive use, mine fields could be laid as defensive perimeters at harbor entrances, ports and in open seas to prevent an enemy attack by the sea. The US Navy no longer relies on surface laid mines; instead, submarines or aircraft lay them.

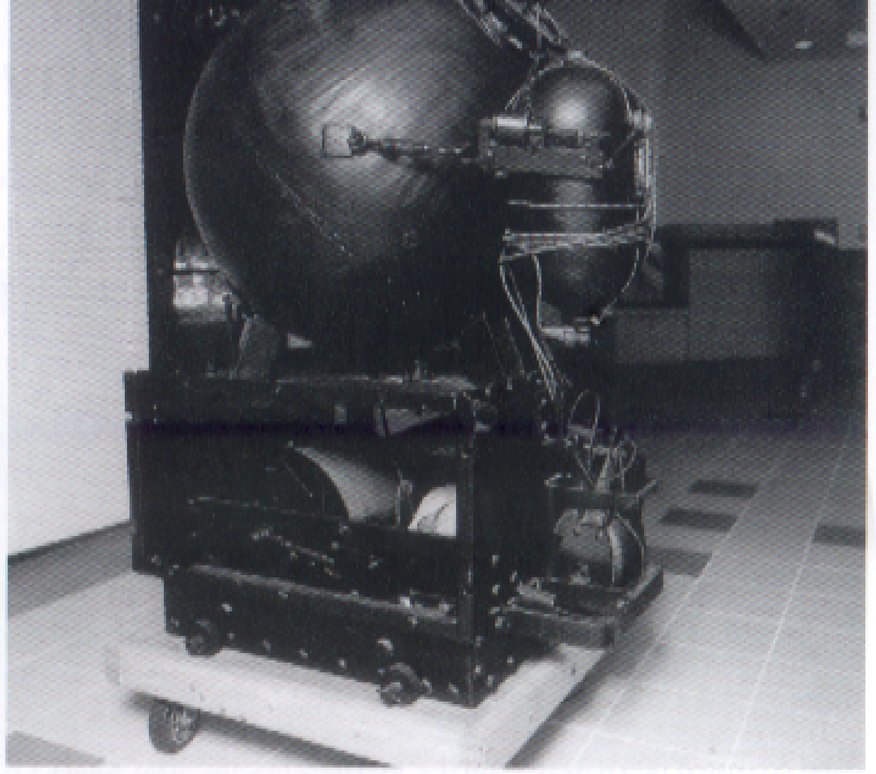
When war broke out in the Pacific in 1941, the light minelayers were used for their primary job of laying mines and in a secondary role of ocean escort. All eight DMs were converted during the war by removing one boiler and stack, which increased their fuel capacity and their range. Armament changes included exchanging the 4-inch guns for the dual-purpose 3-inch/50 guns and adding up to five 20MM Oerlikon cannon. To further increase their offensive capabilities, a pair of depth charge roller tracks was fitted to the fantail and 'K' guns were added to the quarterdeck.

The conversion from destroyer to light minelayer was deemed a success and twelve of the later ALLEN M. SUMNER (DD-692) Class of 1942-43 were converted and completed in 1944 to increase the offensive mine capabilities of the US Navy Pacific Fleet.

Only two light minelayers (DMs) were lost during World War Two. MONTGOMERY (DM-17) struck a Japanese-laid mine in Ngulu Harbor, Caroline Islands on 17 October 1944. A Japanese *kamikaze* (suicide aircraft) hit GAMBLE (DM-15, ex-DD-123) off Iwo Jima on 18 February 1945. She stayed afloat and was towed to waters off Saipan in the Marianna Islands, where GAMBLE was scuttled.

The US Navy began to convert surplus 1916-1917 Class 'liberty destroyers' into light mine layers classified as DMs in 1930. GAMBLE (DM-15, ex-DD-123) was converted to a DM with the removal of the four triple torpedo tubes, installation of mine rails (tracks), and moving the Number Four 4-inch gun to the quarterdeck deckhouse. The DMs wore their original destroyer hull numbers until 1938, when the DM hull numbers were added. GAMBLE is camouflaged in Measure 1, Dark Gray. She was severely damaged by a *kamikaze* off Iwo Jima on 18 February 1945. GAMBLE was taken under tow and scuttled off Saipan in the Marianna islands. (Elsilrac)

The destroyer light mine layer RAMSAY (DM-16, ex-DD-124) is camouflaged in Measure 1, Dark Gray in 1943. She is armed with four 3-inch/50 guns and five 20MM cannon. Splinter shields are fitted to all gun positions except the 3-inch gun on the quarterdeck deckhouse. Port and starboard mine rails extend from under the boat davits to the stern. The DMs had a capacity to carry 80 Mk 6 mines. The US loaned RAMSAY to Britain in 1944. (Elsilrac)



A Mk 6 moored mine sits on its launching cradle while on display at the Naval Coastal Systems Laboratory in Panama City Beach, Florida. This mine contained 300 pounds (136 KG) of TNT and cost approximately $400 to produce. The US Navy built over 100,000 Mk 6 mines between the world wars. (Don Shepherd)

MONTGOMERY (DM-17, ex-DD-121) was converted to a light mine layer in 1931 and placed in Mine Division 2. She is armed with four 3-inch/50 guns and five 20MM cannon. One boiler and funnel were removed to allow for increased fuel capacity. MONTGOMERY was lost in Ngulu Harbor, Caroline Islands Chain when she struck a Japanese-laid mine on 17 October 1944. (Floating Drydock)

The newly converted destroyer light minelayer TRACY (DM-19, ex-DD-214) served with Mine Division 1 at Pearl Harbor, Hawaii in 1937. She is painted in Measure 3, the Light Gray System and displays the Mine Warfare emblem – a red, white, and blue segmented circle with a black center disc – on the bow, just aft of the hull number. The Union Jack – a blue flag with 48 white stars – flies at the bow jackstaff. (Elsilrac)

PREBLE (DM-20, ex-DD-345) was converted to a destroyer light minelayer in 1937, then joined Mine Division 1 at Pearl Harbor. She is camouflaged in Measure 1, Dark Gray and has SA air-search and SU sea-search radar antennas on her foremast. Shadows on the aft hull side denote the location of the mine rails. PREBLE was modified with the removal of one boiler and stack to increase fuel capacity. It is unusual that no ship's boats are fitted to the davits. (Real War Photos)

SICARD (DM-21, ex-DD-346) steams out of Adak, Alaska after colliding with the FARRAGUT Class destroyer MACDONOUGH (DD-351) on 13 May 1945. SICARD was converted to a destroyer light minelayer in June of 1937 and then joined Mine Division 1 at Pearl Harbor. She was undergoing repair and refit at Pearl Harbor when the Japanese attacked on 7 December 1941. Following the attack, SICARD went on many mining missions until the end of the war. (Real War Photos)

The destroyer light mine layer PRUITT (DM-22, ex-DD-347) was the last of the 'liberty destroyers,' and she was converted to the minelayer in 1937. She leads various types of landing craft carrying assault troops through the fog toward Attu in the Aleutian Islands in June of 1943. It was a common practice to use destroyers as landing craft guides during inclement weather, since they were fitted with radar and other navigational aides. (Elsilrac)

BOGGS (DD-136) was placed in the reserve fleet following World War One. BOGGS was redesignated IX-36 in 1936 and converted to a destroyer minesweeper four years later, when she was designated DMS-3. She was then disarmed, designated AG-19, and placed in the Mobile Target Division One, Base Force, San Diego, California. BOGGS served with the battleship UTAH (AG-16, ex-BB-31) as a target ship. (That sounds like a whole lot of fun!) (Real War Photos)

PALMER (DMS-5, ex-DD-161) was converted to a DMS configuration in 1940. She is camouflaged in Measure 22, the Graded System and she is armed with four 3-inch/50 guns and six 20MM cannon. SA air-search and SU sea-search radar antennas are fitted to the foremast. Japanese aircraft sank PALMER off Lingayen, Luzon, the Philippines on 7 January 1945. (Floating Drydock)

High-Speed Minesweeper (DMS) Conversions

Mine warfare on a large scale began during the First World War, when a large minefield was sown in the North Sea stretching some 250 miles (402 KM) from Scotland to Norway. Over 72,000 Mk 6 mines were laid in June of 1918 and they were responsible for sinking six German U-boats. The US Navy employed BIRD Class minesweepers (AMs) for clearing these mines after the war.

The 14-knot (16 MPH/26 KMH) BIRD Class ships were slow, but effective minesweepers that relied on other ships and aircraft for defensive protection when sweeping in hostile waters. A minesweeper with more speed was required, but no action was taken until 1940, when the US Navy selected 17 surplus WICKES and CLEMSON Class destroyers to be converted to High-Speed Minesweepers (DMS). One further conversion to increase the minesweeping community's strength was undertaken on HAMILTON (DD-141) in 1942.

The first ship to be converted was DORSEY (DD-117) and she became the class leader and was redesignated DMS-1. The conversions consisted of removing the four triple torpedo tubes and adding sweep gear. The stern was clipped to provide clearance for the fantail mounted twin launching cranes. The fantail and amidships area was fitted with wire cable reels to stream out the minesweeping paravanes. The Number Four 4-inch gun was relocated to the aft superstructure to allow the installation of the sweep gear. Rounding out the offensive armament were a pair of depth charge roller tracks angled out over each side of the stern over the propeller guards. Dual-purpose 3-inch/50 guns soon replaced the 4-inch weapons for increased protection against aircraft. Up to six 20MM Oerlikon cannon were installed to further augment the anti-aircraft defensive armament.

Following their conversions to high-speed minesweepers, the first four DMSs were stationed in San Diego, California. DORSEY (DMS-1), LAMBERTON (DMS-2, ex-DD-119), BOGGS (DMS-3, ex-DD-136) and ELLIOT (DMS-4, ex-DD-146) formed the Mobile Target Division One, Base Force. BOGGS and LAMBERTON were disarmed and reclassified AGs (auxiliary ships) – AG-19 and AG-21, respectively – and served as unarmed mobile targets.

The minesweepers' duty is a necessary and highly dangerous task. First, the moored mines must be located by previous sightings (usually from the sinking of a ship), known or suspected sown areas or electronic devices such as sonar. The minesweeping paravanes are then lowered over the side attached to a wire cable and streamed out from the side of the minesweeper. Up to four paravanes could be deployed at one time to locate the mines. The paravanes have cutters mounted on them that either cut the mooring cable or the antenna wire. Once the mooring cable is cut, the mine or antenna housing will float to the surface where it can be safely destroyed by rifle or machine gun fire.

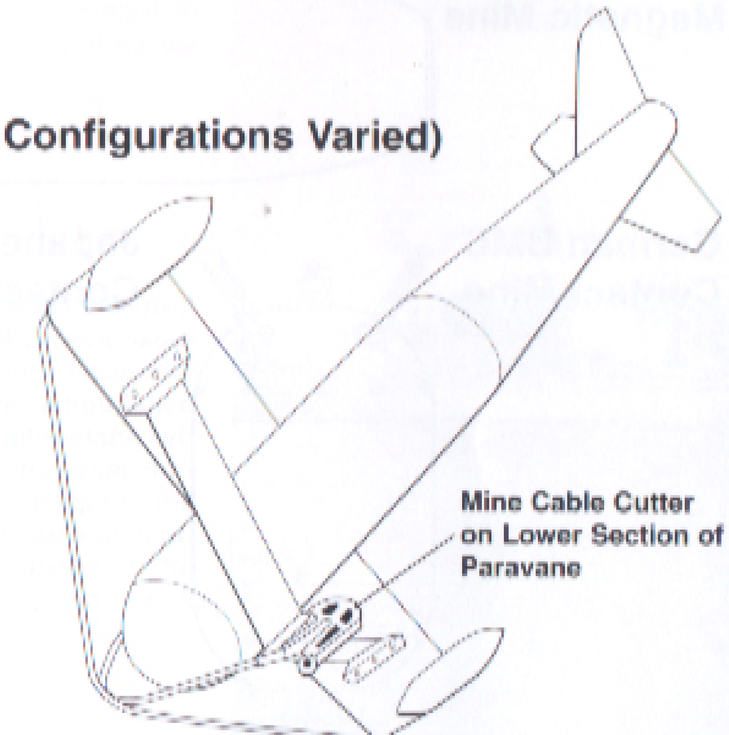
The minesweeper was employed to sweep various types of mines that were used during the Second World War. Both the Axis and Allies used magnetic, acoustic, contact, and pressure type mines and a clear channel was necessary for ship movements during the conflict. A degaussing cable was strung around the vessel's hull and energized with electric power to protect the minesweepers from magnetic mines. The reverse electric power effectively reduced the steel hull's magnetism.

Five high-speed minesweepers were lost during the war in the Pacific. WASMUTH (DMS-15, ex-DD-338) sank herself when a fierce storm blew up off the Aleutian Islands, Alaska on

Minesweeping gear is stowed amidships and to stern of PERRY (DMS-17, ex-DD-340). She was further modified with the removal of one boiler and stack and the addition of five 20MM cannon. PERRY carries four paravanes: two amidships and two on the quarterdeck. She struck a mine – not an unusual occurrence for a minesweeper – and sank off Palau Island in the Caroline Islands on 14 September 1944. (Elsilrac)

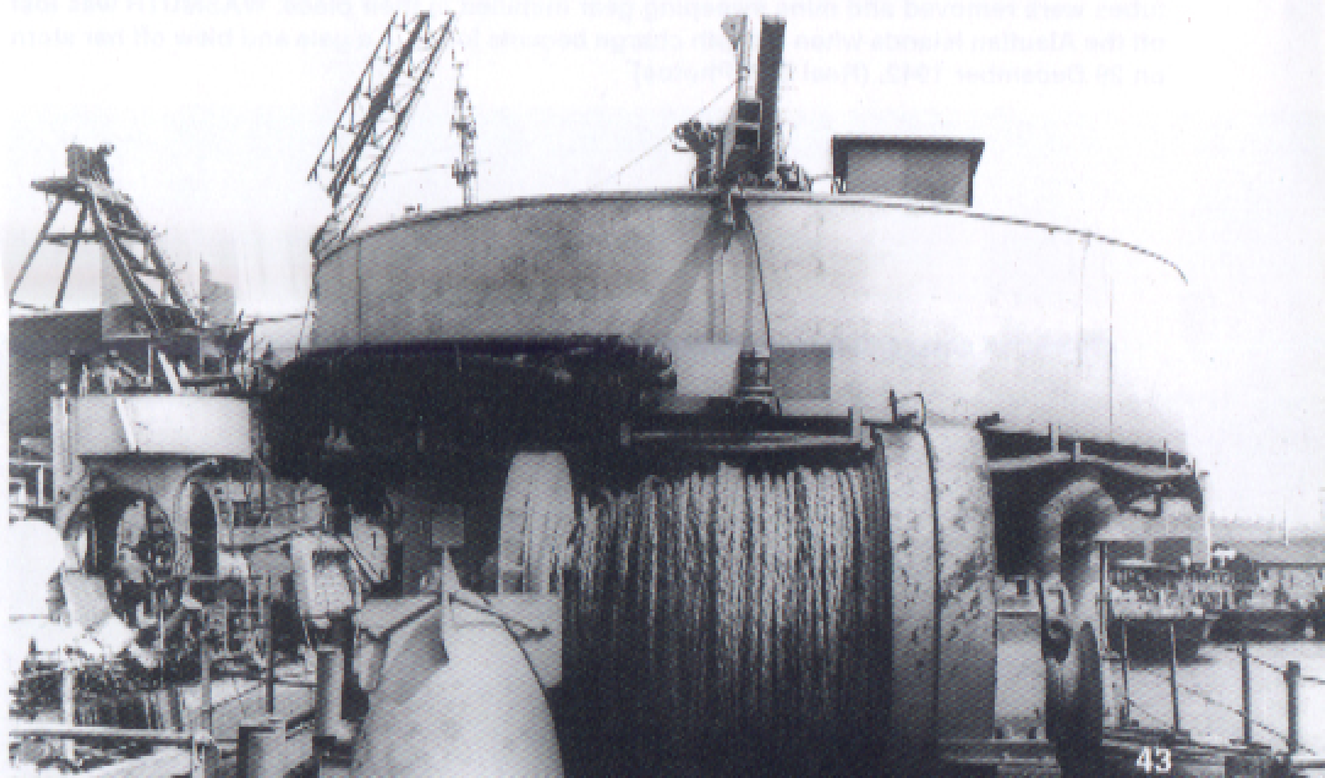
29 December 1942. This gale caused two armed depth charges to break loose and explode, which blew off the stern and sank the ship. A total of 135 of WASMUTH's crew were saved from the sea. PERRY (DMS-17, ex-DD-340) was sunk when she contacted a mine off of Palau on 14 September 1944. HOVEY (DMS-11, ex-DD-208) and LONG (DMS-12, ex-DD-209) were both sunk in Lingayen Gulf, Luzon, the Philippines on 6 January 1945, when they were probably mistaken for destroyers and sunk by Japanese aerial bombs. PALMER (DMS-5, ex-DD-161) was sunk in Lingayen Gulf by a Japanese *kamikaze* (suicide aircraft) the following day.

Paravane (Typical; Configurations Varied)



HOWARD (DMS-7, ex-DD-179) displays her minesweeping modifications as she enters Norfolk Navy Yard in Portsmouth, Virginia on 17 February 1943. Her stern has been bobbed to allow the two-paravane handling cranes sufficient clearance. The quarterdeck is covered with wire reel paravanes and two depth charge roller tracks that have been angled out over the propeller guards. HOWARD is camouflaged in Measure 22, a scheme that was employed in the Atlantic and Pacific in 1943. (Floating Drydock)

A paravane rests on its handling cradle on HOWARD (DMS-7), with the wire reel just forward of this cradle. The paravane was streamed on the wire behind the minesweeper. Once a mine cable was encountered and cut, the mine would float to the surface where it was destroyed by gunfire or explosive charges placed by Underwater Demolition Teams (UDTs). (Floating Drydock)



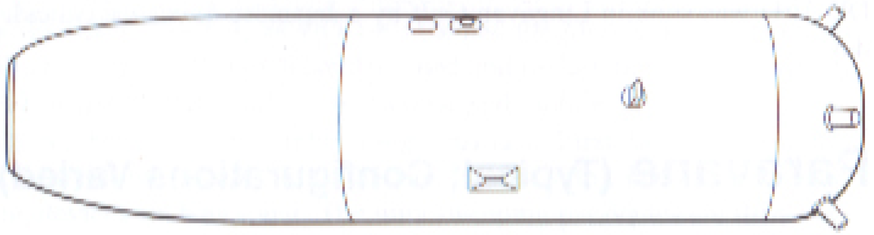
LONG (DMS-12, ex-DD-209) was converted to a high-speed minesweeper in 1940. One boiler and stack were removed and minesweeping equipment was fitted amidships and on her quarterdeck. Further conversions were the removal of all four triple torpedo tubes and adding five 20mm cannon. The bandstand amidships searchlight was moved to a platform atop the bridge. Both LONG and HOVEY (DMS-11, ex-DD-208) were lost in Lingayen Gulf, Luzon, the Philippines on the same day, 6 January 1945. Japanese aircraft probably mistook them for destroyers when they attacked both ships. (Elsilrac)

ZANE (DMS-14, ex-DD-337) served with Destroyer Division 24 until she was converted to a high-speed minesweeper in 1940. She was rearmed with five 3-inch/50 guns and three 20mm cannon. The mid-deck 3-inch guns were placed on a pedestal to increase their arc of fire. SA air-search and SU sea-search radar antennas are fitted to her foremast. ZANE is camouflaged in Measure 21 Navy Blue. The optical range finder and Radio Direction Finder (RDF) antenna are located atop the bridge. (Floating Drydock)

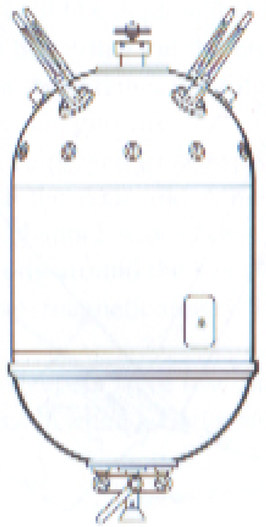
WASMUTH (DMS-15, ex-DD-338) stands out of harbor early in World War Two. She is camouflaged in Measure 1 Dark Gray. Her conversion to high-speed minesweeper included the removal of one boiler and stack and rearming with four 3-inch/50 guns. The torpedo tubes were removed and mine sweeping gear installed in their place. WASMUTH was lost off the Aleutian Islands when a depth charge became loose in a gale and blew off her stern on 29 December 1942. (Real War Photos)

Axis Mines

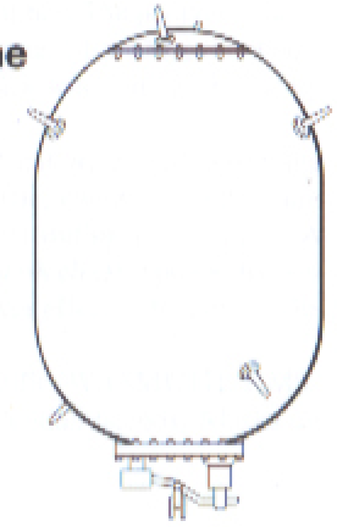
German LMB Magnetic Mine



German BMC Contact Mine



Japanese Contact Mine



Seaplane Tender (AVP/AVD) Conversions

The US Navy introduced long-range navy patrol bombers such as the Consolidated PBY Catalina into the Pacific operating area in the late 1930s. To extend the range of the patrol bombers, 14 of the CLEMSON Class 'flush deck' destroyers were converted to seaplane tenders and redesignated AVPs.

The conversion from destroyer to seaplane tender consisted of removing two boilers and associated stacks and the beaching of the four triple torpedo tubes. The space formerly occupied by the boilers was plated up and a aviation gasoline tank put in its place. A fuel pipe carried the gasoline along the outside of the hull to lessen the risk of an internal fire. Removing two of her boilers reduced the vessel's maximum speed from 35 knots (40 MPH/65 KMH) to approximately 25 knots (29 MPH/46 KMH).

The two forward superstructure mounted 4-inch guns were removed and replaced by .50 caliber (12.7MM) machine guns. The Number Two quarterdeck mounted 4-inch gun was placed atop the aft superstructure to make room on the aft deck. Her 4-inch guns were replaced with dual-purpose 3-inch/50 caliber guns to increase anti-aircraft defenses in 1942. To further increase aerial protection, up to nine 20MM Oerlikon cannon were installed on the bridge top and bandstands amidships. To take advantage of the ship's installed Anti-Submarine Warfare (ASW) equipment (sonar), a single depth charge roller track was installed on the fantail.

A boat-handling crane replaced the main mast in some conversions to facilitate the launching and recovery of the four motor whaleboats to fuel and provision the patrol bombers. A derrick type crane was fitted in other conversions, notably HULBERT (AVD-6), leaving the main mast in its original place.

The seaplane tender conversions took place between 1938 and 1940 and the first seven ships were originally designated as AVP-14 through AVP-20. The AVP designators were changed to AVD in 1940, with CHILDS (AVD-1) being the class leader.

HULBERT (AVP-19, ex-AVD-6, ex-DD-342) was converted to a seaplane tender in 1939. It was used to support various Patrol Squadrons (VPs) operating Consolidated PBY Catalinas and Martin PBM Mariners while they were away from their home base, which increased their range of operations. HULBERT's conversion included removing her four torpedo tubes, two boilers and stacks, and two of the 4-inch guns. Aviation gasoline storage tanks were added and a boat-handling crane fitted in place of the main mast. The tender's crewmen used their four whaleboats to refuel the patrol planes. The National Insignia on the bow indicates HULBERT's operation with the Neutrality Patrol in the Atlantic. (Elsilrac)

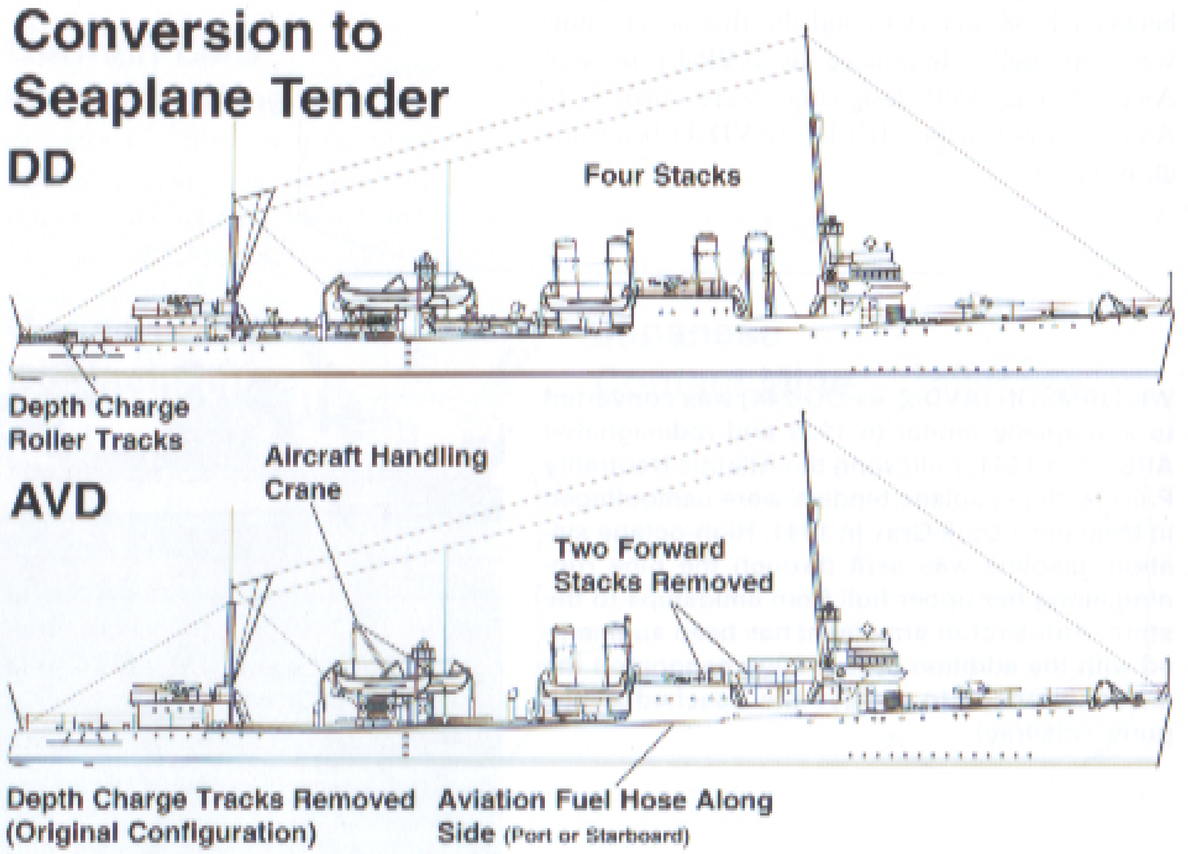
WILLIAMSON (AVD-2, ex-DD-244) was converted to a seaplane tender in 1939 and redesignated APD-27 in 1941. Following the Atlantic Neutrality Patrols, the seaplane tenders were camouflaged in Measure 1 Dark Gray in 1941. High-octane aviation gasoline was sent through the pipe running along her upper hull from amidships to the stern. Anti-aircraft armament has been augmented with the addition of four 20MM cannon on the amidships deck to replace the beached 4-inch guns. (Elsilrac)

The seaplane tender BELKNAP (AVD-8, ex-DD-251) was converted back to a destroyer in 1942. She kept her hull number 8 and was assigned to Task Group 12.21 with the escort carrier BOGUE (CVE-9) in the Atlantic hunting German U-Boats in 1943. Both BELKNAP and BOGUE were awarded the Presidential Unit Citation for their actions with the Task Group. BELKNAP's conversion back to destroyer status included removing the boat handling crane and adding a pair of 20mm cannon in a bandstand. She is camouflaged in Measure 12, modified. (Elsilrac)

BALLARD (AVD-10, ex-DD-246) was converted to a seaplane tender in 1939, then assigned to service and fuel US Navy seaplane patrol bombers at pre-designated rendezvous in the Atlantic and Pacific. She has increased 20mm cannon armament and is fitted with a single depth charge roller track at the stern. BALLARD carries a 26-foot (7.9 m) whaleboat and a 30-foot (9.1 m) motor launch. She appears to be camouflaged in Measure 11 Sea Blue (approx. FS35045), which was used in the Pacific and Mediterranean. (Elsilrac)

HULBERT (AVD-6, ex-DD-342) was blown aground at Massacre Bay, Attu Island in the Aleutians in 1943. The Aleutian Islands are famous for instant fog, gale, and hurricane force winds that blow out of the Bering Strait. HULBERT waited for the tide to rise and be freed with the aid of tugs. She was converted to a high-speed attack transport designated APD-28 in 1943 and used to land troops in the island hopping campaign in the Pacific. (Elsilrac)

Conversion to Seaplane Tender



Fast Attack Transport (APD) Conversions

The US Navy began converting the CALDWELL Class destroyer MANLEY (DD-74) into the first fast attack transport (APD) in 1938. She became the prototype for the 36 APDs converted from CALDWELL, WICKES, and CLEMSON Class destroyers. Once the conversion was completed, MANLEY was redesignated AG-28.

The conversion included removing two boilers and their associated stacks, the four triple torpedo tubes and – in some of the later conversions – exchanging the 4-inch guns for the dual-purpose 3-inch weapons. Four Landing Craft, Vehicle, Personnel – LCVP– Landing Craft, Personnel, Large – LCP(L) – or Landing Craft Personnel, Ramp – LCP(R) – were fitted to the four boat davits that were installed amidships. Each landing craft had the capacity of 36 embarked troops or four tons (3.6 MT) of cargo. For anti-submarine protection, the depth charge roller release tracks and 'K' gun depth charge projectors were retained.

The defensive and offensive armament was increased with the addition of .50 caliber (12.7MM) water-cooled machine guns that were mounted on the forecastle, top of bridge, and in various locations on the main deck. The 20MM Oerlikon cannon was also fitted as they became available. Both the .50 caliber and 20MM weapons were used to rake a beach with automatic fire to keep the enemy's heads down and to destroy their emplaced bunkers.

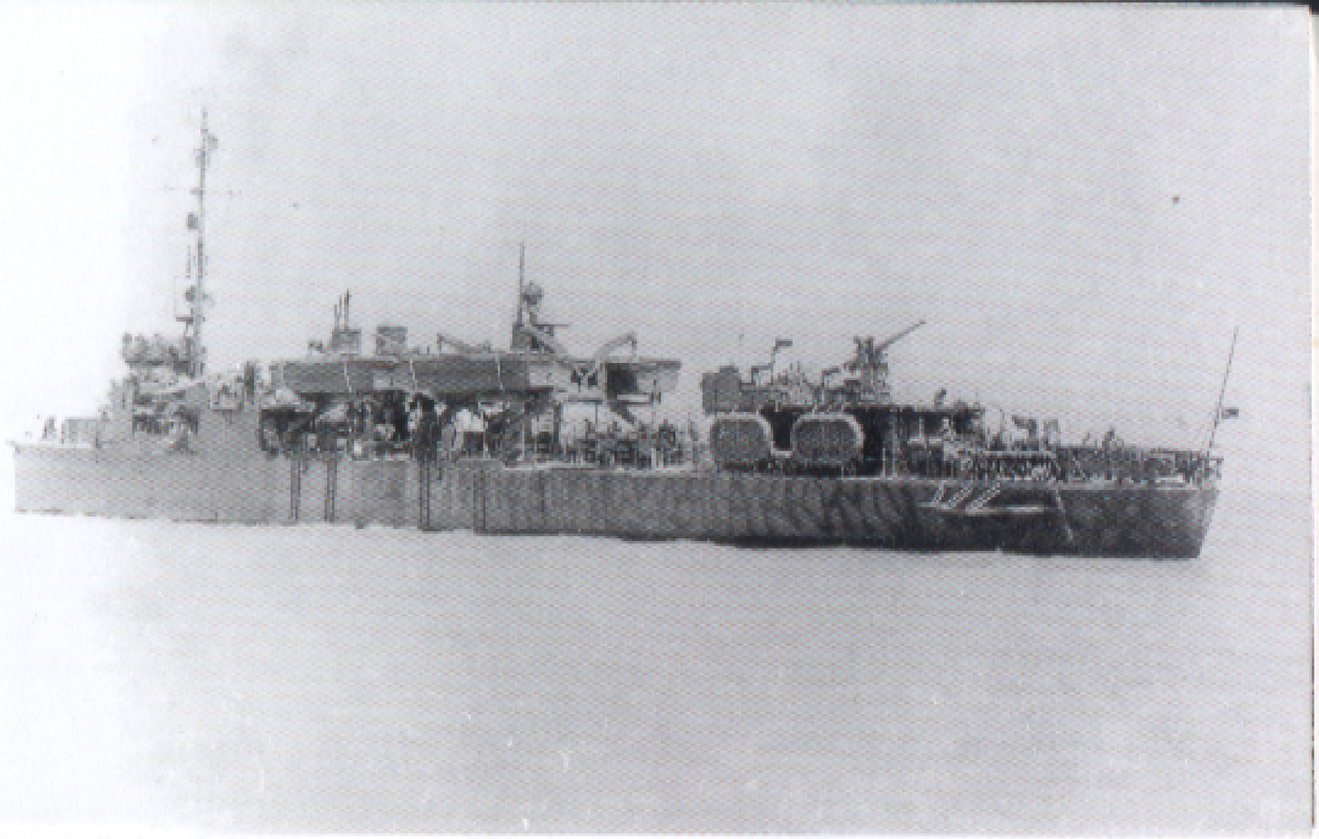
APDs were utilized to transport Army and Marine amphibious troops to Pacific islands – usually those bypassed by major assaults – to capture them from Japanese forces. Three APDs could transport up to a battalion of approximately 1000 troops along with their associated equipment and supplies. Once their destination was reached, the four landing craft were launched and the troops would 'go over the side,' climbing down cargo netting into the boats.

The APDs' conversion and design was quite varied as expected, regarding stack height, armament, landing craft type carried, and camouflage paint schemes. On some APDs, the stacks protruded above the four boat davits, while others had the davits at the same height as the stacks. Armament also varied from ship to ship; either 3-inch or 4-inch guns were carried, and the number varied from two to four of the guns. Anti-aircraft protection was provided by .50 caliber machine guns or 20MM cannon, with up to nine of either weapon fitted.

Camouflage paint schemes were also quite varied, with either Measure 1 (Dark Gray, approximately FS36163) or Measure 3 (Light Gray, approx. FS36320) being the norm before the war. Measure 31/15T became the standard camouflage scheme for the Pacific Theatre. This was the Dark Pattern System that consisted of Navy Green (approx. FS34128), Ocean Green (approx. FS34227), and in some instances Haze Green (approx. FS34300). The 31/15T pattern varied among the APDs.

There were eight losses of the 'flush deck' APDs during the war in the Pacific. The most notable was that of WARD (APD-16, ex-DD-139). She succumbed to a Japanese *kamikaze* off Leyte on 7 December 1944 – three years to the day after the attack on Pearl Harbor. Early on the morning of 7 December 1941, WARD fired on and depth charged a Japanese mini submarine outside the entrance to Pearl Harbor. This attack – the first shots fired by US forces in the Pacific War – occurred just over one hour before the Japanese air attack on Pearl Harbor.

The early APDs converted from the World War One-era destroyers were quite a successful design and the US Navy completed 36 such conversions by 1942. Experience gained from these early successes led the US Navy to begin converting Destroyer Escorts (DEs) to this role in 1944. This resulted in 80 DEs converted to high-speed transports by 1945. When the war in the Pacific ended in 1945, the surviving 'flush deck' APDs were declared surplus and sold for scrap.



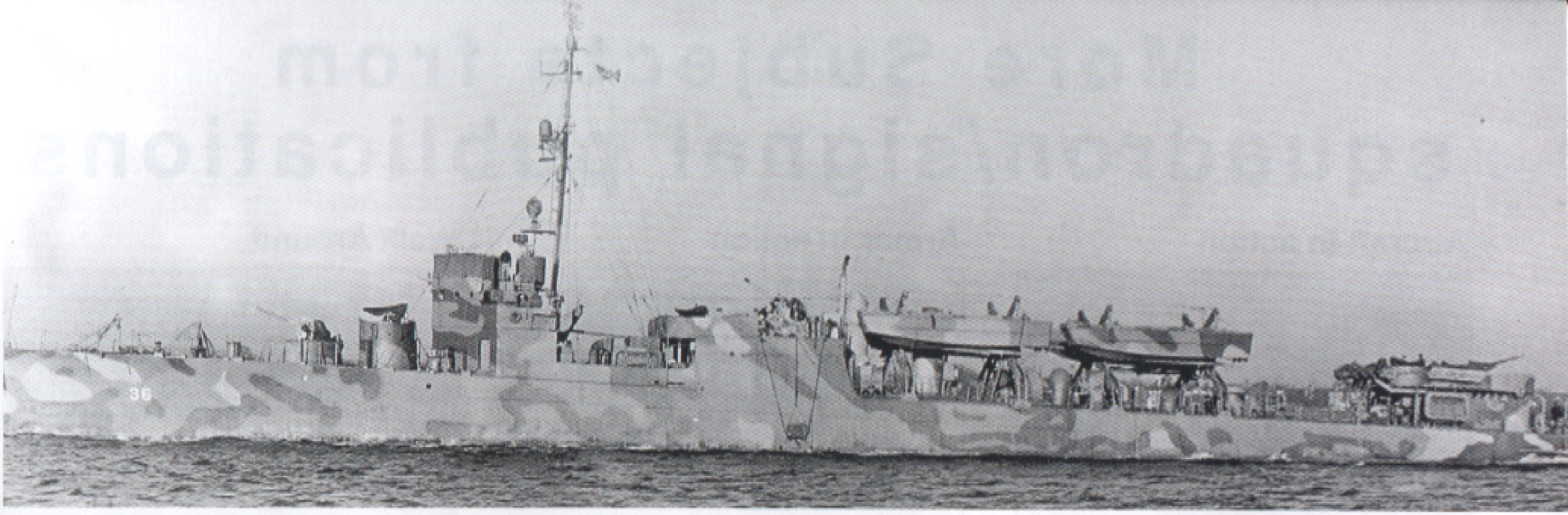
MANLEY (APD-1, ex-DD-74, ex-AG-28) was the prototype for the fast attack transport. The CALDWELL Class destroyer was converted in 1938 with the removal of two boilers and stacks as well as two 4-inch guns and all triple torpedo tubes. Following her conversion, she served with Destroyer Division 32, Atlantic Squadron, US Fleet. MANLEY was rearmed with 3-inch guns replacing her 4-inch guns. She was also fitted with 'K' guns and depth charge release tracks. (Floating Drydock)

COLHOUN (APD-2, ex-DD-85) was the first of the 'liberty destroyers' to be converted to APD standards. She is armed with four 4-inch guns plus a pair of .50 caliber (12.7MM) Colt machine guns on the forecastle and 20MM cannon on the bridge top and amidships bandstand. She is camouflaged in Measure 12, modified. COLHOUN was lost off Guadalcanal on 5 September 1942, when Japanese bombs struck her. The FLETCHER Class destroyer COLHOUN (DD-801) was named to honor her departed sister. On 6 April 1945, the later COLHOUN was sunk by a Japanese *kamikaze* off Okinawa.

STRINGHAM (APD-6, ex-DD-83) was modified to APD standards in 1940. Two boilers and stacks were removed and four gravity operated boat davits added. The amidships 4-inch gun was mounted on the ship's centerline amidst the life rafts. Ready rounds for the Number One 4-inch gun are situated on the face of the bridge. STRINGHAM appears to be camouflaged in Measure 10, the Ocean Gray (5-O) System. (Real War Photos)

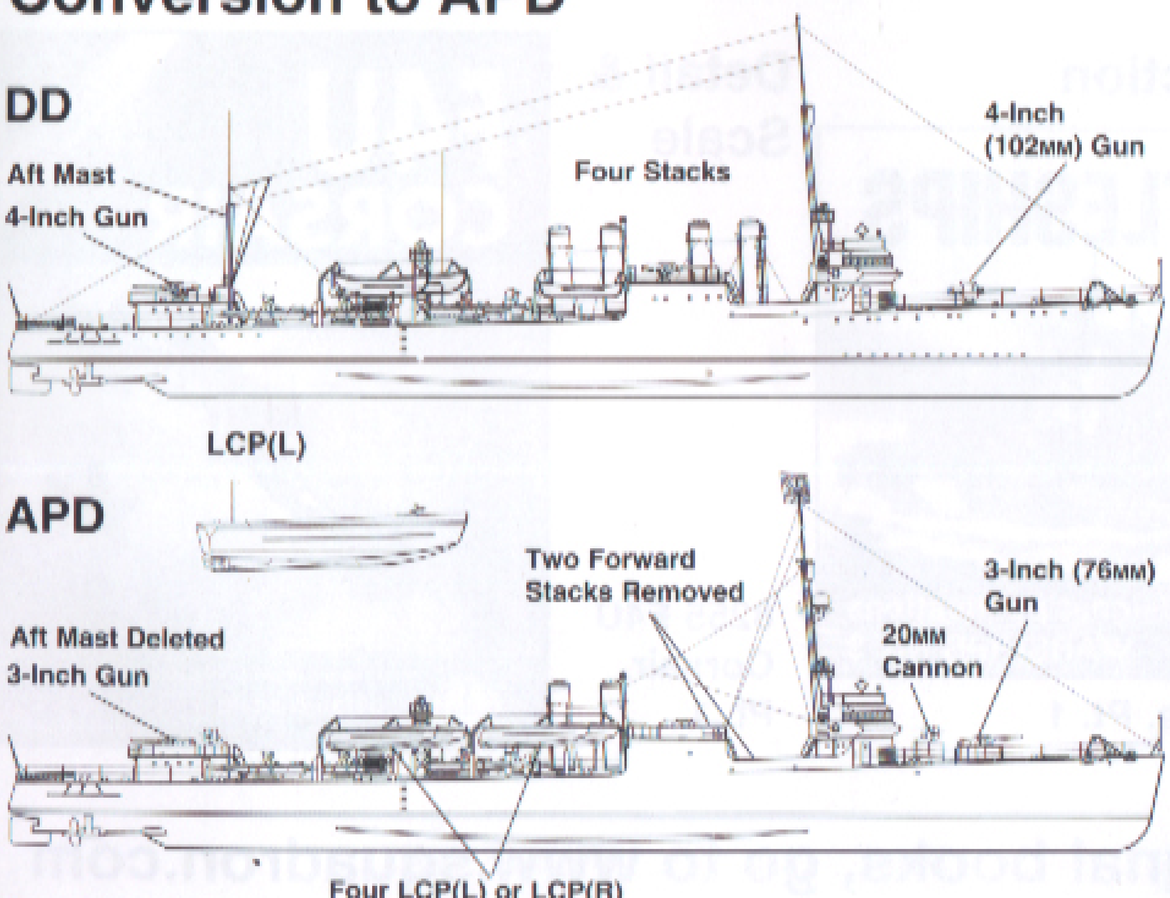
McKEAN (APD-5, ex-DD-90) is finished in a Measure 31-15T camouflage scheme in 1943. Two water-cooled .50 caliber machine guns are fitted between the Number One 4-inch gun and the bridge on the forecastle. A pair of 20MM cannon is situated on the bridge and aft bandstands. The LCP(L)s have white markings on their bows: 'D' for APD, '5' for the parent ship's hull number, and 1 and 3 for the starboard boats and 2 and 4 for the port side vessels. Japanese bombs sank McKEAN off Bougainville, Solomon Islands on 17 November 1943. (Real War Photos)

BROOKS (APD-10, ex-DD-232) passes the battleship WEST VIRGINIA (BB-48) while they are on their way to bombard Leyte, the Philippines on 19 October 1944. BROOKS soon landed her embarked troops on the island. The 'opera box' extension off the front of the bridge for the 20MM cannon is interesting, since it is constructed over the old 20MM shield. BROOKS is camouflaged in Measure 31-15T, the Jungle Scheme of Ocean Green (approx. FS34227) and Navy Green (approx. FS34128). (Real War Photos)



GREENE (APD-36, ex-DD-266, ex-AVD-13) leaves Norfolk Navy Yard on 24 January 1945, heading to the Pacific via the Panama Canal. She has a fresh coat of camouflage Measure 31-15T paint. GREENE had her two stacks cut down to the level of her four LCVP amphibious landing craft to reduce her silhouette. The high pipe protruding from in front of the Number One stack vents the exhaust of the onboard 250 kw generator. GREENE is armed with four 3-inch/50 guns and five 20mm cannon, while SA and SU radar antennas are fitted to the foremast. GREENE was converted from a light seaplane tender (AVD) to an APD. (Real War Photos)

Conversion to APD



TATTNAL (APD-19, ex-DD-125) departs Norfolk Navy Yard on 25 January 1945, bound for the Pacific and the landings on Iwo Jima, Saipan, and Okinawa. She is armed with five 20mm cannon with the Mk 14 electric gun-sight located on the forecastle shielded mount. SA air-search and the new SL sea-search radar antennas are fitted to the foremast. Circular Identification Friend or Foe (IFF) antennas are located on the yards. TATTNAL is camouflaged in Measure 31-15T, which was used for attack transports and landing craft in the Pacific. (Real War Photos)

HMS CAMPBELTOWN (I.42) sorties in the North Atlantic on 28 March 1942, hours before it rammed the drydock gates at St. Nazaire, France. The British modified the former USS BUCHANAN (DD-131) to represent a German MÖWE Class torpedo boat and painted CAMPBELTOWN 'Mountbatten Pink' (Plymouth Pink) for this commando raid.

USS BERNADOU (DD-153) is camouflaged in Measure 31/3D while steaming in the North Atlantic in 1944. The US Navy developed this scheme for destroyers that year. BERNADOU previously raided the docks at Casablanca, French Morocco during the Allied Invasion of French North Africa on 8 November 1942.

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